

THE IRON AGE

A Review of the Hardware, Iron, Metal Trades.

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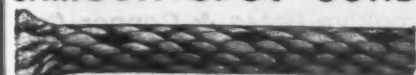
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THE IRON AGE

THURSDAY, MARCH 24, 1904.

The "Sorts" Caster.

A Type Casting Machine for Printers.

While all of the arts have made wonderful progress within the past 100 years, few, if any, have excelled that made in printing, particularly when the product, machinery, appliances and the various methods involved to produce perfect work in the least possible time are considered. In the pressroom gradual and steady improvement has been made from the old Franklin hand press to the present perfecting power press, but in the composing room the advancement was less noticeable until the introduction of the Linotype machine, which brought about a radical change from former methods by producing new and perfect type for each issue of the

injecting operation are features which will probably be of special interest to those familiar with the vacuum system now used for the perfect casting of small articles.

The three main parts of the machine are a self adjusting mechanism, which places and clamps the mold ready for casting; an automatic regulating mechanism, which injects into the mold the exact quantity of metal at the proper density for the cast required, and a self adjusting mechanism, which finishes and ejects the type. The body size of the type is determined by interchangeable mold parts, which are inserted in a stationary mold part permanently secured to the frame. The insert mold parts are merely laid in the machine in their proper position, and are automatically clamped in correct relation to the stationary mold parts without occasioning the operator to use his discretion. To provide the proper

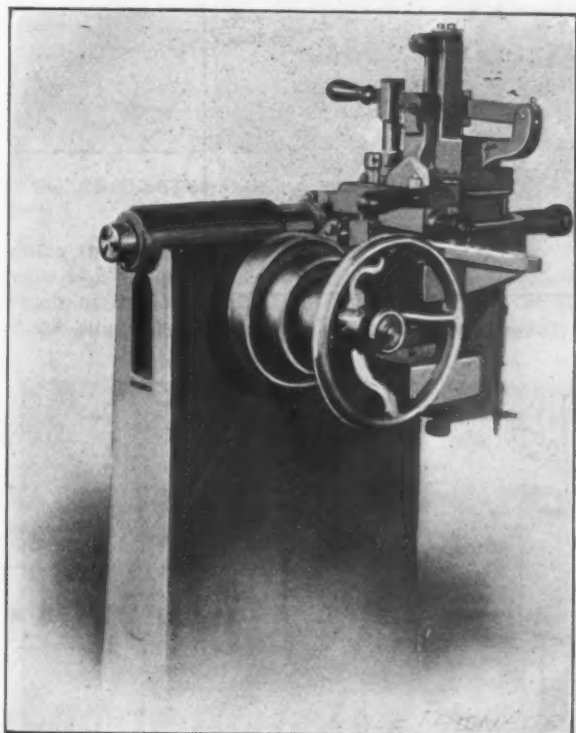


Fig. 1.—The Mold Parts Clamped and the Machine Ready to Use.

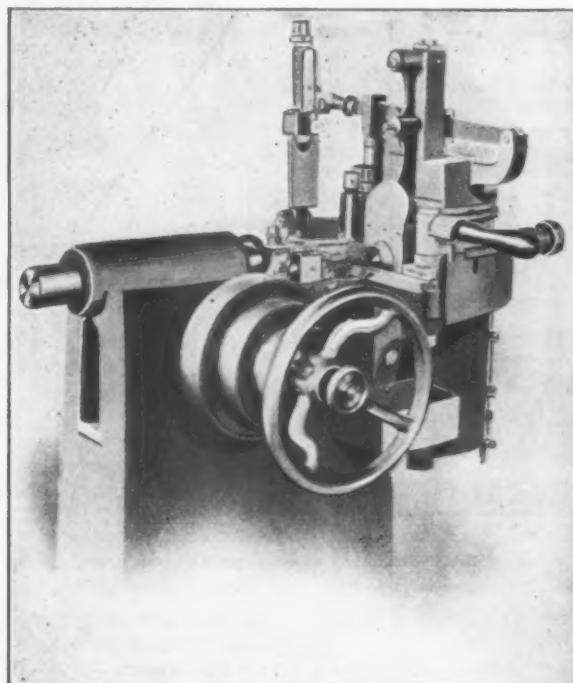


Fig. 2.—Machine Open for the Insertion of the Interchangeable Parts for a New Character.

periodical. This machine, however, is adapted only to the setting of solid matter, and the printer has still had to purchase material, such as display type, characters, ornaments, spaces and quads, for the balance of his composition, usually representing about two-thirds of the required material, and also endure the annoyance and disadvantage of being out of "sorts" and the anxiety as to whether the case contained sufficient type to produce the work in hand. The advent of the sorts caster, recently put on the market by the National Compositype Company, Baltimore, Md., has placed at the command of the printer a machine which will enable him to produce in his office all the above type, and when necessary body type, without engaging skilled labor for the work. The machine is an exceedingly simple one, occupies a floor space 27 x 45 inches, weighs about 800 pounds, and will produce accurate and uniform type of standard dimensions from 6 to 36 point. The actual casting or injecting of the molten metal into the mold is done under a pressure of 200 pounds to the square inch, giving perfect type with sharp, clearly defined corners. The method of producing and holding the parts of the mold and the

width of type, graduate liners stamped with the size to which they correspond are used. These are placed in the frame and limit the travel of a sliding ejector which forms one vertical side of the mold. As an illustration, if the operator wants an 18-point face 3 points wide, he selects the 18 point insert mold parts, adds the matrix for the required character and places it with the 3-point liners in the machine, after which no further attention is needed.

The arm H, Fig. 4, when turned down and clamped to the position shown in Figs. 1 and 3, covers the mold parts and forms bearings for the wedges D and B, which clamp the insert molds E in casting position. Referring to Fig. 4, when the plunger carrying these parts of the mold advances or moves toward the right, the beveled portion D passes under the arm H and locks the top and bottom parts of the mold in position. The same movement brings the tapered arm B into action, clamping the sides so as to produce the correct width of type. It will be seen, then, that the stationary mold provides for two sides of the type, the ejector one side, while the remaining three sides are formed by the insert mold parts, including

the face, which is produced by interchangeable matrices. The latter are secured in the mold by a conical screw working in a countercone concentric with the line of action of the screw, by which the matrix is drawn against two of its sides, insuring perfect alignment of the type face in both directions.

The insert molds are termed self adjusting, inasmuch as the operator has but to place them in the carrying shoe,

terchangeable insert molds and corresponding ejectors are changed for each height of type required, but in changing from one width to another it is only necessary to substitute a different liner. Any change within the range of the machine can be accomplished in one or two minutes.

The next important element in the machine is that which ejects the molten metal. This consists of the nipple F, Fig. 4, from which the metal flows from the melting

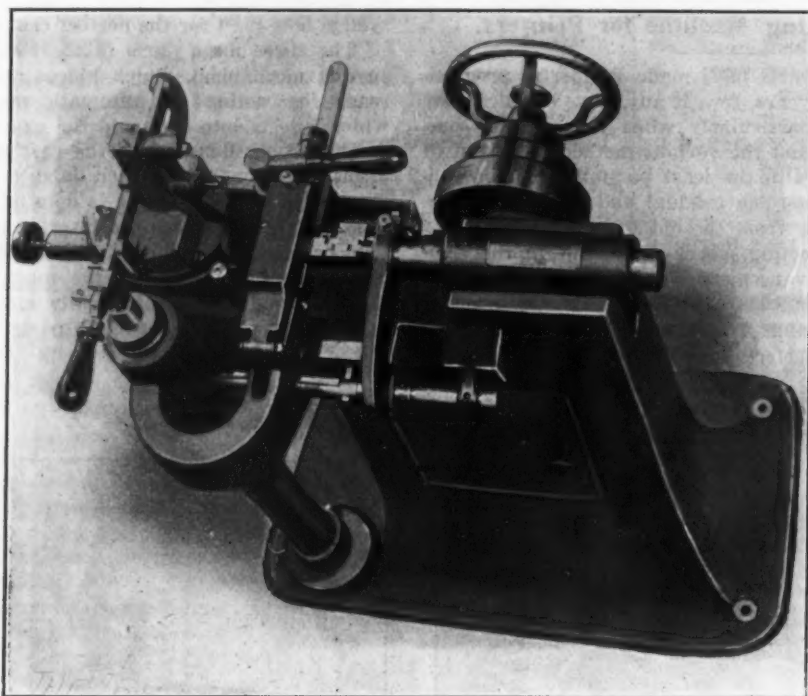


Fig. 3.—Looking Down On the Machine.

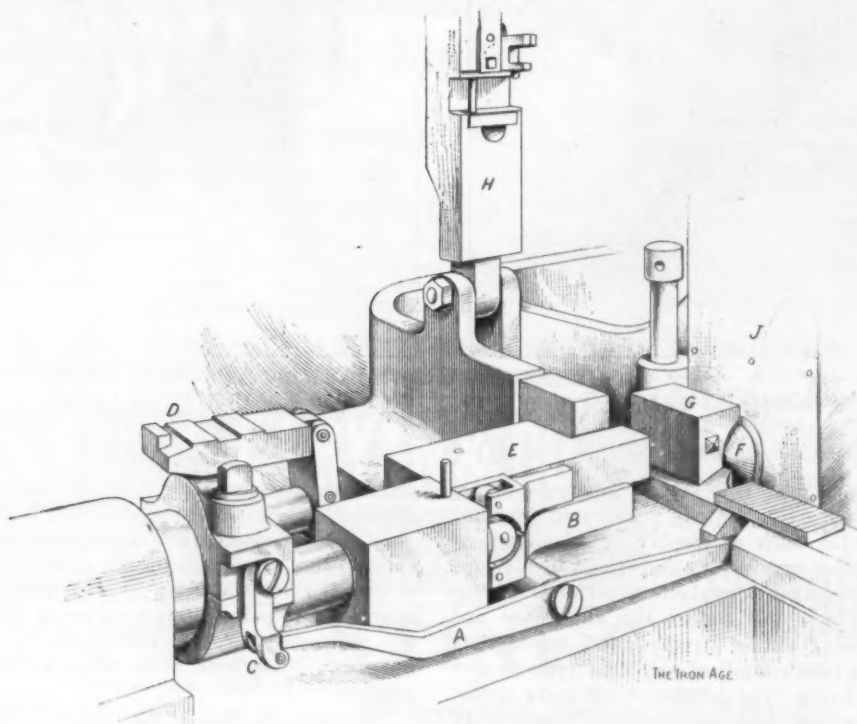


Fig. 4.—Perspective Showing the Parts Which Have to Do With the Actual Casting.

which, being moved by the plunger, clamps them together. The wedges previously referred too then lock the mold in three directions—namely, against the foot or base of the type, the top of the type and one of its sides, and these being plural and compensating in their action, positively force the mold to its correct casting position, insuring parallel type. The liners are placed between a butting block and a projection on the type ejector which, as already stated, forms one side of the type body. The in-

pot J to the mold, a horizontal choker which governs the opening, and a vertical pivoted lever which actuates the choker. The latter is made to compensate for expansion and wear of the parts and insures the firm seating of the choker in the nipple valve. It is pivoted at the upper end while its lower end engages a slot in the choker, and is deflected horizontally by contact with a follower on the hand lever, Fig. 6, as the latter is raised and lowered. The hand lever simultaneously operates the pump plun-

ger and depends for its movement upon the reciprocating rod which grips it near the handle. The reciprocating rod is raised by a rocking lever, and being tripped descends by its own weight, a dash pot at the bottom cush-

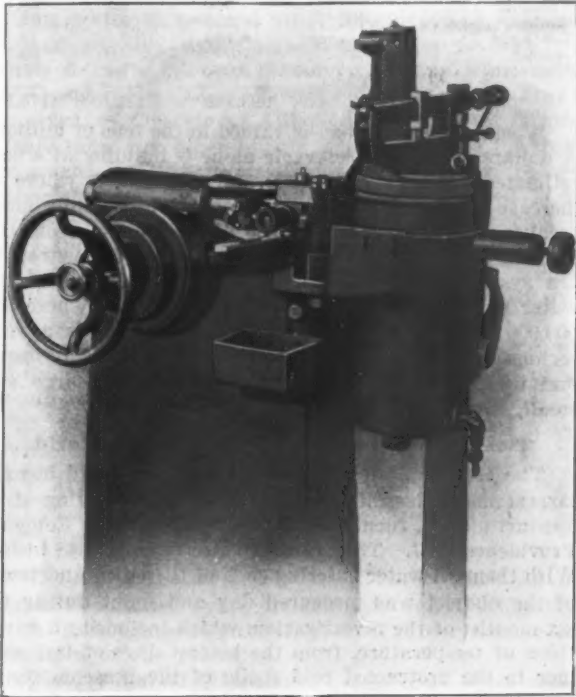


Fig. 5.—Three-Quarter Rear View, Showing Melting Pot.

ioning the fall. In the column, seen in Figs. 6 and 7, there is a weight of about 40 pounds hung on the rod, which, by the two to one arms of the lever and the area of the pump plunger, is sufficient to exert a pressure in

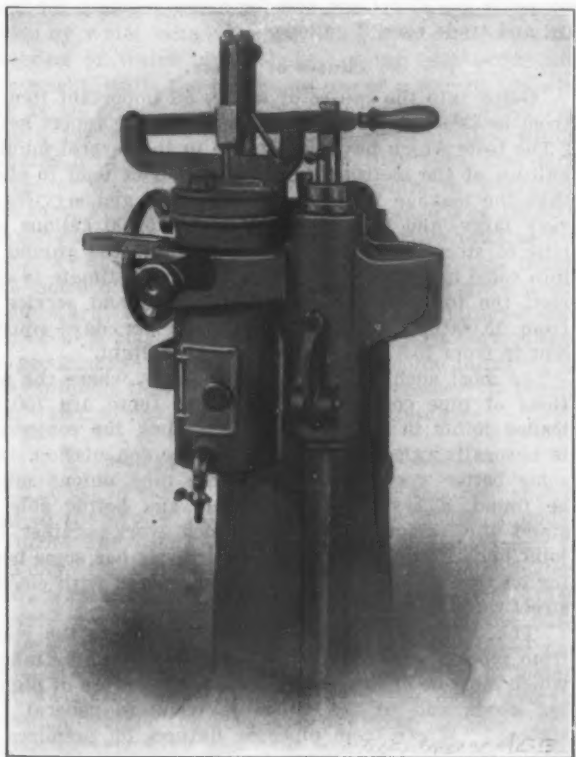


Fig. 6.—Rear View, Showing the Mechanism Actuating the Pump and Choker.

the neighborhood of 200 pounds per square inch on the metal. During the downward movement of the weight the horizontal lever is disengaged at the right instant to cut off the supply of the metal from the mold, when it is at the proper density. This action is varying throughout

the range of the casts, depending upon the cavity formed in the mold, and insures perfect type irrespective of the size.

After each cast is made the gate is struck off by a cutter, actuated by the lever A, which is tripped by the trigger C, as the plunger carrying the mold parts recedes. Simultaneously the mold parts separate, and the type is ejected by the lateral movement of the ejector, which is driven by an oscillating shaft. As the pieces of finished type accumulate, the action of the ejector on the succeeding pieces causes them to be forced out of the machine along the slide, where their rough ends are trimmed as they pass a set of stationary cutters.

The fundamental actuating member of the machine is the horizontal ram, which carries the mold and is reciprocated by a crank on the cone pulley shaft. From this ram all of the movements are communicated; those on the mold directly and those for the pump plunger, choker and ejector, as already described, through an arm con-

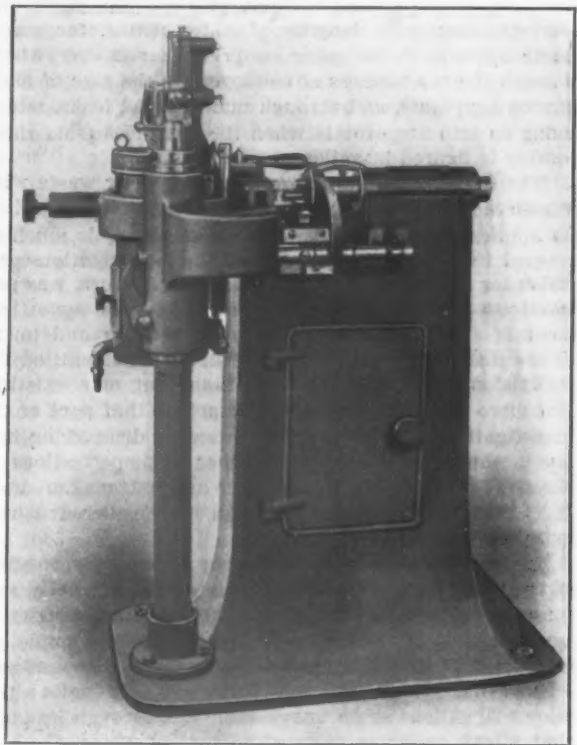


Fig. 7.—Side Opposite to that Shown in Fig. 1.

necting the ram with the horizontal oscillating rod on the side of the machine seen in Fig. 7.

No measurements of any kind are required in the use of the machine, the parts being so arranged that all expansion and contraction are automatically provided for and no after labor is necessary for producing type of standard dimensions and quality. The matrices for the faces used in these machines are made by a special electro deposition process in use at the company's factory, by which the cost of production has been greatly reduced from that attending the making of matrices for any of the ordinary foundry type-casting machines. The price of a set of matrices is said to be practically that of an ordinary case of type, and from it the owner may produce as much or as little of the particular face as he may want, without any appreciable additional cost except that for metal.

A dispatch by Canadian Associated Press from London, England, says that Austin Chamberlain, British Chancellor of the Exchequer, replying in Parliament to a question as to protection against iron imports into Britain from Canada, stated that the imports of Canadian pig iron rose to over 50,000 tons in 1901, but fell in 1903 to under 4000 tons. The abolition or modification of the Canadian bounty was a subject for consideration when the fiscal relations between Britain and Canada came up for settlement.

The Waste of Water.

Result of the Boston Investigation.

The Metropolitan Water and Sewerage Board, which has in charge the water and sewage system of the metropolitan district made up of Boston, Mass., and 17 other cities and towns in the immediate vicinity has made its report on a careful and systematic investigation of the consumption of water in the district, during which all water entering the mains was metered for a period of about six months. The results are startling, in that the waste of water is proved to be enormous, being at least equal to and probably greater than the water legitimately and normally used. The deductions drawn by the engineers of the Water Board, as it is generally called, are of vital interest to municipalities everywhere in the civilized world, for the question of water supply is one that is ever becoming more serious. In addition many manufacturers may read a lesson to their financial profit, especially where a plant is large, with spacious yards and corresponding great lengths of water mains, for water waste appears to be going on pretty much everywhere through the carelessness of employees in the case of manufacturing plants, and through underground leaks, which count up into huge totals when the total loss from these sources is figured in gallons.

The report goes into the question of water waste with considerable elaboration. Much of it is strictly local in its application, but, on the other hand, there is much of general interest. The purpose of the investigation, provision for which was made by act of Legislature, was primarily to get statistics upon which to base the apportionment of the cost of water among the cities and towns of the district, and a number of plans are submitted for a division on a different basis than that now existing. But more general interest will attach to that part of the investigation which was directed toward discovering how much water is being wasted, either by imperfections in the system or because of improper and extravagant uses. It is these latter results that will be considered in this article.

Here are some of the deductions: That fully one-half of the more than 100,000,000 gallons which are daily sent into the service mains of the metropolitan district is wasted; that 60 gallons per consumer is an ample allowance, and that it is practicable to save at least 40 gallons of the 120 gallons now furnished per capita; this allows 20 gallons as an unavoidable loss through leakage; that where water is metered to the consumer, the consumption per consumer is generally less than one-half of what it is where water is not metered, this being true after making due allowance for the character of the takers; that the cost for new water works not already under construction for the metropolitan district within the next 25 years will be \$32,000,000, unless measures are taken to put a stop to the waste, and, in addition, millions of dollars must be spent for additional sewage facilities to take care of the water after it has been delivered to the consumer. What applies to this district also applies to many other large cities where water is not metered and where other wastes, due to insufficient and unintelligent inspection, are permitted to continue.

Comparison of Metered and Non-Metered Cities.

The effect of metering water to consumers is well illustrated in the following table, showing two groups of cities, the first where most of the water is metered, the second where only a small part of it is metered:

Group 1.			
City or town.	Number of consumers.	Per cent. of services metered.	Consumption (Gallons per day per consumer).
Milwaukee, Wis.	308,000	80.0	81.0
Providence, R. I.	198,400	84.5	78.0
Worcester	119,330	94.5	68.0
Fall River	107,650	96.0	41.0
Lowell	100,000	65.0	57.0
Lawrence	65,000	83.0	53.0
Brockton	37,800	90.0	36.0
Newton	35,400	86.0	54.0
Woonsocket, R. I.	34,474	96.0	29.0
Ware	7,690	100.0	44.0
Wellesley	5,147	100.0	49.0
Reading	4,385	100.0	33.0
	1,023,276	....	61.7

Group 2.			
Buffalo, N. Y.	360,000	2.0	324.0
Indianapolis, Ind.	169,100	6.0	79.0
New Haven, Conn.	108,300	2.6	150.0
New Bedford	61,000	18.0	104.0
Cambridge	94,150	15.0	85.0
Haverhill	37,200	10.0	95.0
Lynn	74,000	25.0	63.0
Waltham	24,550	6.0	99.0
Salem	36,250	3.0	79.0
Montague	6,150	2.0	73.0
Dedham	7,500	2.0	83.0
Braintree	5,980	1.0	91.0
	993,880	....	178.5

Where a water system is valued in the tens of millions of dollars, where one reservoir alone is building at a cost estimated between \$20,000,000 and \$30,000,000, where to increase a supply will always cost proportionately more because of the greater distance of the supply from the point of distribution, all of which is true of the metropolitan system, then to permit a waste of one-half of the water supply, to distribute 100,000,000 gallons where 50,000,000 or 60,000,000 is an ample allowance, is a very serious matter. And what is true in the case of Boston and its suburbs is also true of other cities, large and small, all over the United States.

The Largest Meter Installation in the World.

The Metropolitan Water and Sewerage Board has the largest meter installation in the world, consisting of 49 Venturi meters, furnished by the Builders Iron Foundry, Providence, R. I. They range in size from 8 to 48 inches. With them all water entering each of the cities and towns of the district was measured day and night during the six months of the investigation, which included all variations of temperature, from the hottest days of last summer to the protracted cold spells of the present winter. Careful estimates were made of the amount of water furnished for public purposes, the results, measured in gallons per capita per day, being as follows: Public buildings, 3.78; drinking and ornamental fountains, 1; street sprinkling, 2.13, and flushing water pipes and sewers and extinguishing fires, 0.20. Extended investigations lead the engineers of the commission to place the total quantity of water actually required for legitimate use in the district at 60 gallons per inhabitant per day, allowing for domestic use 25 gallons, and for manufacturing, mechanical and trade uses, 7 gallons.

Causes of Waste.

Going into the causes of waste, an important item is from leaks in street pipes and mains. The report says: "The tests which have been made in the several municipalities of the metropolitan water district tend to show that the leakage from the street mains and services is very large, and that from 10,000 to 15,000 gallons per mile of street main escape each day into the ground or into some underground channel. If this estimate is correct, the total leakage from the mains and service is from 15,000,000 to 22,500,000 gallons per day—equivalent to from 16.5 to 25 gallons per inhabitant."

As most such leaks are in the joints where the sections of pipe come together, and as there are 750,000 leaded joints in the 1451 miles of pipes, the conjecture is naturally raised, though not by the commission, that some better system of making the pipe unions might be found, a system more durable and better able to stand the various influences which work against the joint underground. Probably electrolysis has some bearing on this question in a section so covered with electric street railway systems.

The report pays considerable attention to the waste from pipes and fixtures on the premises of water takers, which must be of interest to the manufacturers of plumbing goods and to the plumbing trade in general. It states: "Waste from pipes or fixtures on premises of water takers is due either to defective plumbing or to permitting the water to run from open fixtures, either negligently or willfully. Where the amount paid for water is not dependent upon the quantity of water used, the average water taker pays little attention to the condition of the plumbing on his premises; and so long as the leaking fixtures cause no damage to his property they are seldom repaired, unless discovered by inspectors from the Water Department. For this reason the amount of waste from defective fixtures in cities where

meters are not used depends largely upon the thoroughness with which the house to house inspection is done by the local authorities. The greatest source of negligent waste from defective fixtures is undoubtedly the ball cock, which controls the flow of water into tanks supplying water closets and other fixtures. The ball cock seldom remains tight more than a few months, and when defective allows a constant stream of water, often of considerable size, to flow unseen, though not always unheard, to the sewer. Although the ball cock is more liable than any other plumbing fixture to be the cause of waste, its inspection is more difficult than that of other fixtures, the tanks being generally placed in inaccessible places in buildings. Unless the inspection is very thoroughly performed, the greatest source of this kind of waste is therefore apt to be overlooked. Nevertheless, more tank fixtures are reported defective than any other class."

The following figures, taken from the annual reports of the Boston Water Department, show the results of inspections made during the past five years:

	1899.	1900.	1901.	1902.	1903.
Number of fixtures in use	644,468	653,189	689,973	698,803	.....
Total fixtures leaking.	10,539	6,035	4,624	6,160	10,888
Faucets leaking.....	7,995	2,634	1,963	3,282	5,086
Water closets leaking..	4,887	1,091	199	223	294
Pipes leaking.....	1,179	362	249	268	426
Willful waste.....	113	42	22	67	5

The differences between the number of leaks reported in different years are probably due to differences in the thoroughness of the inspection rather than to the condition of the plumbing.

The results of inspections in several other cities and towns are given as follows:

City or town.	Taps, sinks, bowls, baths and wash trays.		Water closets and tanks.	
	Number in use.	Number found leaking.	Number in use.	Number found leaking.
Chelsea	23,232	1,006	8,813	1,872
Everett	22,680	548	6,368	1,138
Revere	8,104	126	2,642	579
Somerville .....	.....	757	.....	1,404
Winthrop	6,803	69	2,296	101

Another great source of waste occurs during the winter, when large quantities of water are run through the pipes by water takers for the purpose of preventing the freezing of water in the house piping. To prove this statement, while the legitimate use of water in the winter is no greater than in the months of November and April, the actual use is much larger in the winter months. In November and April, 1902-1903, the daily average was 105,000,000 gallons, while in December, January, February and March the average was 122,000,000, these being round numbers. The same relative difference existed in the two years previous. This is taking the metropolitan district as a whole. In the cities where meters are in general use waste of this character does not occur to any material extent, as each property owner is peculiarly interested so to arrange the plumbing in his buildings that it does not become necessary to permit the water to run in order to prevent freezing.

The Use of Meters is the Remedy.

The use of meters is the panacea for this evil, according to the Water Board. An example of this follows: "During the past two years the Water Department in the city of Cleveland has been engaged in placing meters upon service pipes. At the end of the year 1902, 11,099 meters were in use on 56,816 services, and the daily average consumption for the year was 69,964,740 gallons. At the close of the year 1903 the number of meters had been increased to 25,193, and the daily average consumption for the year was 62,012,000 gallons. As a result of this work the daily average consumption for the year 1903 was about 8,000,000 gallons per day less than in 1902, and the greater part of this reduction was no doubt due to the meters set during the previous year."

The report is valuable in the character of the men who supervised the investigation, and also in the character of the territory covered by the metropolitan system. The nearly 900,000 inhabitants whom the water system serves reside or do business in cities and towns of widely different character of population, covering an area of nearly 143 square miles. The question has been studied

from all sides, with the earnest purpose of making this, the first complete investigation of the kind, one that will have a serious and beneficial influence in reducing the enormous costs for water supply.

Every water taker has an interest in the saving of water, because the less expense the municipality goes to for water supply the less the cost per 1000 gallons to the consumer. The municipality is not in the water business to make money, but to meet expenses. The water bill is a tax, apportioned according to the amount of benefit received by the taxpayer. It is fair to presume that the individual resident of the metropolitan district in Massachusetts would be paying much less for his water if 60,000,000 or 70,000,000 gallons were going into the mains each day, instead of more than 100,000,000, and what is true in this respect to-day will become much more evident as the years go by.

"Lycodin," a Substitute for Lycopodium.—It is a well established fact that lycopodium, which is used in large quantities as a facing powder by founders, has not until recently had a perfect substitute. The excellent qualifications of lycopodium as a facing material and the considerable difficulty by which it is obtained have always kept the price quite high. Lycopodium is from a genus of evergreen plant. It is a very mobile pale yellow fine powder, consisting of the sporules or seeds of the club moss. It is odorless, tasteless, floats on water, which does not wet it, and burns quickly when thrown on a flame. These last two characteristics are very essential in its use as a facing powder. It is used in large quantities in foundries as a facing powder. The surfaces of the molds are moistened so as to cause the facing powder to adhere, thereby producing such a perfectly smooth surface that the resultant casting will not adhere to the sand. It likewise prevents the appearance of sand holes, and also permits the metal to reach the fine and more minute impressions of the mold. The fact that lycopodium floats on water and that the inability of lycopodium to incorporate itself with water are very characteristic. The following experiment is quite interesting: Into a glass of water pour upon the surface a quantity of lycopodium and dip the finger well into the glass. Upon withdrawing the finger you will notice a fine and delicate coating remains, which to the touch is perfectly dry. Now with the finger perfectly dry introduce the same into the dry powder, and upon withdrawing it you will notice that no coating remains, excepting some in the finer folds of the skin. These simple tests are used by the buyer of lycopodium, which on account of its high price is frequently adulterated by unscrupulous dealers with pine-pollen, starch, sand, &c. A disadvantage in using lycopodium as a facing powder is that the patterns at times must be carefully and entirely moistened so as to cause an adherence of the lycopodium over the entire surface. This continual moistening of the pattern, if it be of wood or plaster, is in time very detrimental. An old saying of the molder is, use enough water to only moisten the sand in the flask. This rule is often broken and with the result that many castings are ruined and unfit for use, entailing quite a loss to both the founder and the manufacturer. We have had the opportunity to observe the introduction lately of an ideal substitute for lycopodium as a facing powder. This new facing powder is called "lycodin" (patented in Germany and in the United States, where the representatives are the United States Lycodin Company of Cincinnati, Ohio), and deserves great recognition by the various firms of founders. We have tested this new preparation and compared it with lycopodium, and can give an unprejudiced opinion regarding the same. It makes a parting in each and every instance equal to that of lycopodium. Two characteristics distinguish "lycodin" from lycopodium. Lycodin is of lighter color, being more grayish, and decidedly cheaper in price. In testing Lycodin with water as before mentioned it exhibits the same phenomena as lycopodium. Lycodin has a still greater advantage in that it can be applied without moisture in all instances to the dry surface of a highly or otherwise polished pattern. Lycodin also covers one-third more surface than lycopodium.—*Der Metallarbeiter.*

The Report of An Expert.

Views of E. C. Shankland of Chicago Concerning Steel Structures in the Baltimore Fire.

Of the many reports compiled by prominent engineers and architects as a result of their investigations of the fire proofed steel structures within the fire zone of Baltimore's recent conflagration, one which has been most eagerly awaited is that prepared by E. C. Shankland of Chicago. We have just received a copy of it and are permitted to give it its first publicity. While Mr. Shankland's deductions from the scientific data furnished by the fire were accompanied by photographs, &c., we are only reproducing herewith such as show features of interest, in addition to the reproductions presented in our own description printed in *The Iron Age* under date of February 25. The notes which we have interpolated refer to the illustrations contained in this description. In summarizing his conclusions Mr. Shankland says:

It seems to me the most important lesson this fire

to do away with the necessity of cutting and mutilating the fire proofing by the electricians, plumbers and others. This is very important, as there is always more or less cutting of the fire proofing, and in some cases the damage is considerable.

Cast iron and steel mullions should be discarded, but brick mullions of sufficient size to allow them to be properly backed up with brick should be used. This will reduce the size of the windows, but in most cases this can be done without serious damage to the building.

Granite and other stone will continue to be used for lower stories, but should not be put in any stories above the second or third.

Ornamental terra cotta has shown itself to be much inferior to brick, and the latter should be used as far as possible. Where enameled or press brick is used for facing it should be bonded into the brick backing by using headers, and not depending on the metal clips. When terra cotta is called for it should be solidly backed up with concrete, and all hollow spaces completely filled with same.

It has been said a great many times since this fire

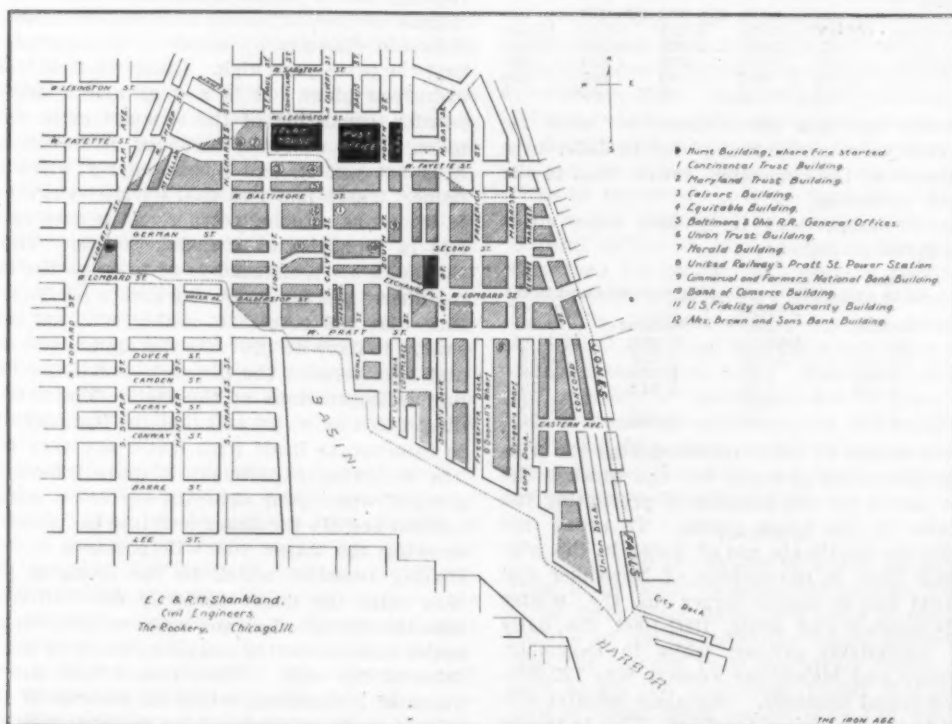


Fig. 1.—Map of the Burned Area of the Baltimore Conflagration, showing the location of the fire proofed steel structures which proved to be the only buildings to survive the fire structurally intact.

teaches is the necessity for better workmanship, and more improved methods on the lines already laid down. A few years ago it was common practice to put only a 1-inch thick plate of hollow tile on the bottom of the floor, and this plate, on account of its thinness, had to be fastened to the beams with metal clips. Within the last four or five years, however, the best practice has increased this thickness to 2 inches. The superiority of the latter is shown in the Continental as compared with some of the older buildings where the thin soffit covering was used. Then, in order to reduce the dead weight, the architects have insisted on, and the manufacturers have furnished, tile having the minimum weight per square foot. This necessitated ribs which are too thin and which easily break at the fillets. The ribs should be made thicker and fillets made stronger.

More care should be used in setting the tile. The webs and flanges of all beams should be first plastered before tile is set in place.

Above all, the steel columns should be fire proofed first, and all pipes, tubes for wires, &c., should be placed outside of the fire proofing. [See Figs. 26 and 27, *The Iron Age*, February 25.]

Means should also be devised to so run pipes, &c., as

that the use of all wood, including the floors, should be discontinued.

It is certain that wire glass and metal sash in smaller frames than are now in buildings should be used, and wood trim avoided or made as small as can be done. As to wood floors, architects have tried many times to put mosaic or concrete floors in the offices, but the tenants will not have it, and the architect has had to abandon the scheme in every case I know of.

It may be urged that in this fire metal frames would have melted, and so have been no better than wood. This may or may not be true, but a fire like this only occurs at long intervals, and in all other cases, even if we except this, the wire glass and metal frame will be of great value.

A very hot fire occurred recently in the fifth story of the Masonic Temple, Chicago, in the southwest corner. The room was used for packing X-ray tubes, and a large quantity of excelsior was stored there. The fire broke the outside windows and the flames enveloped the Randolph street exterior clear to the cornice. The building seemed to be doomed, but the damage to the building from the fire was slight. It would have been much less if the windows had been made of wire glass with metal

frames, as in that case the fire would have been confined in the room, and would have burned itself out quickly.

That the fire proof buildings acted as a fire stop to a greater or less extent is shown on the St. Paul street front of the Court House. [See Fig. 5, *The Iron Age*, February 25.]

Opposite the *Herald Building* the front is all right, but north of that, opposite a brick building on the corner of St. Paul and Lexington streets, which was entirely

face brick with no headers, the brick being fastened to the backing by metal binders. The fire proofing is flat hollow tile arches and hollow tile partitions, the tile being semiporous. The fire seemed to hit this building on three sides, first striking the west face, then going north, then east, and getting into the court on the east side. The flames seemed to be most severe in from eighth to eleventh floors. [See Fig. 1, *The Iron Age*, February 25.] The steel frame in this building is in



Fig. 2.—The Rear of the Continental Trust Building, showing the brick wall which was so seriously damaged that it will have to be taken down. The cause of the injury was the method of construction; metal ties being used for bonding the bricks.

destroyed, the cornice and upper part of the Court House are badly cracked and spalled.

Overhead wires are a menace and should not be allowed in a district like this. It was a live wire that cost Baltimore the services of its fire chief at the very beginning of the fire, and overhead wires have proved a serious obstacle to fighting fire in many cases.

In describing the buildings individually, they are numbered so as to correspond with the numbers given them in the diagram, Fig. 1.

1. Continental Trust Building,

Southeast corner of Calvert and Baltimore streets.

This is a 16-story building of skeleton construction. Exterior walls are granite in the two lower stories, and brick with terra cotta mullions above. The court has

perfect shape, as good as when first erected. I saw one or more columns on every floor from second to sixteenth, where the column covering had gone, leaving column exposed from floor to ceiling, showing column and floor beam, connections and column splices. Where the column fire proofing failed it was in almost every case on the corridor side. One column had a piece of wood wedged in between the angles to fasten pipes or electric wires to. I cut it with a knife and found it was not even scorched. However, every column that was so exposed had pipes and wire conduits running alongside the column inside the fire proofing. This will be referred to later in the summing up. The upper floors of this building are now practically lofts, all the partitions being gone. Every bit of wood in this building above

the two or three lower floors is gone. The floor strips imbedded in the concrete to which is nailed the wood in floor, the nailing strips in the joints of the brick and tile for fastening the trim, are all completely destroyed; not even a piece of charred wood can be found. The tile floors are in very good shape for the most part, although in some cases the tile covering the lower soffits of the floor beams has fallen, exposing the beams. The contents of the book tile vaults throughout the building were in many cases entirely destroyed. The safety vault in the basement, however, was uninjured, and this is true of all safety deposit vaults in the burned district. The exterior granite is badly cracked and will have to be replaced. The brick above is in good shape, but the terra cotta is in many instances badly warped and cracked; this is noticeably true of the north face. The exterior of the court is destroyed and will have to be replaced. The face brick has fallen off in large areas, due to lack of headers. [See Fig. 2.] The cast spandrels are twisted all out of shape and have forced the spandrels away from the steel frame as much as a foot in some cases. The result as far as this building is concerned is that all the exterior granite, a great deal of the terra cotta, and all the court walls will have to be taken down and rebuilt. The steel frame is intact. A large percentage of the floor and column fire proofing is also apparently uninjured, although it will require an exhaustive examination of all the fire proofing to determine how much of it can be allowed to remain in place. This applies to the fire proofing of all the buildings examined. The balance of the interior is entirely destroyed.

2. Maryland Trust Building,

Northwest corner of German and Calvert streets.

Ten stories, self supporting outside walls on street sides. Granite first two stories; above, large brick corner piers, between which is ornamental terra cotta with brick pilasters. The ornamental terra cotta in this building suffered severely and a large percentage of it will have to be taken down. The brick stood remarkably well as compared with the terra cotta, although at one place the face of the brick has flaked off. The stone in the lower stories is in much better condition than the granite in other buildings, but much worse than the terra cotta above. [See Fig. 3, *The Iron Age*, February 25.] The steel work of the building is in good condition, except in the upper story. Here some of the roof beams are warped and twisted, and one roof column is badly bent. However, the damage to the steel frame is slight and can be easily repaired. The hollow tile fire proofing is more or less damaged; in many cases the underside of the beam is exposed, otherwise the floors are apparently in good shape.

3. Calvert Building,

Southeast corner St. Paul and Fayette streets.

Thirteen stories, skeleton construction. Exterior walls are granite first two stories, above brick and terra cotta. Hard burned tile was used for floor arches, column covering and corridor partitions. Interior partitions for the most part were mackolite. The stone, especially on the west face, is badly cracked, and the terra cotta in the court is so spalled off and cracked that much of it will have to be replaced. Had terra cotta been omitted from the court walls the first cost would have been less, and the court would have been intact to-day. [See Fig. 4, *The Iron Age*, February 25.] A column in the eighth story of this building buckled on all four sides about half way from floor to ceiling. The column is made of two channels and two plates. The plates buckled about $4\frac{1}{2}$ inches, and the channels about one-half as much. This floor was used by the auditor of the Baltimore & Ohio Railroad, and it was said the old tissue paper copies had been piled around the column. Fine paper ashes are in some places 2 feet deep on this floor. [See Fig. 26, *The Iron Age*, February 25.] The buckling of this column has settled all the floors above, but, aside from this, the whole steel frame is in perfect condition. Where the buckling took place the fire proofing of the column was defective, perhaps from being cut when electric wires or plumbing and gas pipes were put in place. In this building, as in the Continental, one

or more columns in every story were exposed, allowing a careful examination of the steel work and the connections to be made. The tile floors are in fair condition, although the tile did not stand as well as in the Continental, and the bottom of the beams is exposed in many cases. The corridor partitions are mostly down and the mackolite partitions completely destroyed. In the basement there was a pile of these mackolite blocks which had been water soaked, and a stick could with ease be pushed several feet into the mass.

4. Equitable Building,

Southwest corner Fayette and Calvert streets.

Nine stories. Outside walls are of granite, brick and terra cotta, and are self supporting; on court side columns are placed next the walls to carry the floors. Cast iron columns and iron beams are used. The floors are 6-inch segmental hollow tile arches, 8 feet span, with 4-inch rise. There is no cinder or other filling on top of these arches, but wood strips were placed on the beams and the floor nailed to them. There was thus an open space between the tops of the arches and the floor, which became a regular flue in the fire. [See Figs. 28, 29 and 30, *The Iron Age*, February 25.] It was the burning of these strips and floor that allowed so many safes to fall through the floor arches and down into the basement. The exterior walls are in fairly good condition, except the granite, which is badly cracked, especially on the west face. The bottoms of most of the beams are badly twisted and belled and will have to be replaced. The columns are in better condition, although their covering is off in most cases. This column covering was, I am informed, made of lime and cinders, a composition called "Limeateal." The concrete block partitions are destroyed. This building is in much worse condition as regards the frame and floors than any other of the fire proof buildings. The floor beams and girders are very light, and, judging from the way the beams are deflected and twisted, the iron work must have been cut to the last pound when it was designed. [See Fig. 2, *The Iron Age*, February 25.]

5. Baltimore & Ohio Railroad General Offices,

Northwest corner Baltimore and Calvert streets.

Six stories. Exterior granite first floor, brick and stone above, with stone lintels. This building had solid outside walls and brick dividing walls, and hard tile floor arches. The floors are in fairly good condition, but both street fronts are badly cracked, not only the granite, but the stone lintels. [See Fig. 12, *The Iron Age*, February 25.]

6. Union Trust Building,

Northeast corner Fayette and Calvert streets.

Ten stories, exterior walls stone and terra cotta; hard burned hollow tile was used for floor arches, column covering and partitions. [See Fig. 6, *The Iron Age*, February 25.] Both street fronts are very badly cracked and will have to be almost entirely replaced. The steel frame is in good condition, but the partitions are gone, and the bottoms of tile arches have fallen off to a greater extent than in any other of the buildings. It was said that the building diagonally opposite was dynamited during the fire, and that this accounts for the bad condition of the floor arches.

7. Herald Building,

Northwest corner Fayette and St. Paul streets.

Six stories, solid walls, first story granite, above brick and terra cotta. Floors are made of steel beams with hollow tile arches. This building is in good condition. The outside walls, aside from the cracking of are granite, are practically uninjured. The floors, beams and columns are uninjured, and most of the arches are in good condition. Partitions are practically destroyed.

8. United Railways Pratt Street Power Station.

There are two buildings. The north one had a wooden roof covered with slate and supported on iron trusses. Windows were clear glass. The roof evidently took fire first and then the trusses fell. [See Fig. 32, *The Iron Age*, February 25; also page 26, *The Iron Age*, March 10.] The south building had fire proof roof made of book tile, and the windows are wire glass. While

some of the stone on front is spalled and cracked, and a telegraph pole in front is burned to a stump, yet this building does not seem to have received the severe fire to which the north building was exposed. It should be said, however, that the fire came across Long Dock from the building between Long Dock and Jones Falls, and from the looks of these ruins the fire east of Long Dock must have been as severe opposite the south as the north building.

9. Commercial and Farmers' National Bank,

Pratt Street, near German.

This is a four-story building, marble front. The first and second floors are Roebling construction. Upper floors and roof are wood. The marble front, except at extreme top, was not in the least injured, showing it was not exposed to the fire. The flames came from above, burned the roof and the two wooden floors, but did not get through the second floor. [See Figs. 8 and 24, *The Iron Age*, February 25.]

10. Bank of Commerce,

South street, at head of Second street.

This is only mentioned on account of its being one of the three buildings in the fire that had concrete floors. The others are Nos. 9 and 11. It has three office floors in front, and in the rear a large one-story banking room. The stone front is in good condition, showing it did not get a severe flame. The roof of the banking room and the concrete floors are intact.

11. United States Fidelity Guaranty Building,

On German street, opposite the Maryland Trust Building.

This is a four-story building with reinforced concrete girders and columns. The contents of the building were destroyed, yet it did not suffer the severe fire, as is shown by the fact that water and drain pipes and other fixtures which had been left exposed when building was remodeled are uninjured. The west wall has partly fallen in upper stories, but the concrete columns are still standing, and apparently in good condition. The girders on the second and third floors are cracked and flaked. It could not be ascertained at the time the building was examined whether this cracking had injured the girders or not.

12. Alexander Brown & Son's Bank Building,

Southwest corner Baltimore and Calvert streets.

This is a one-story building, and is only mentioned because, in the path of the hottest fire, it escaped, the flames going over it to the Continental. [See Fig. 10, *The Iron Age*, February 25.] It was slightly damaged in rear by a falling wall, but here the wire glass windows saved the interior of the basement.

The American Foundrymen's Association.

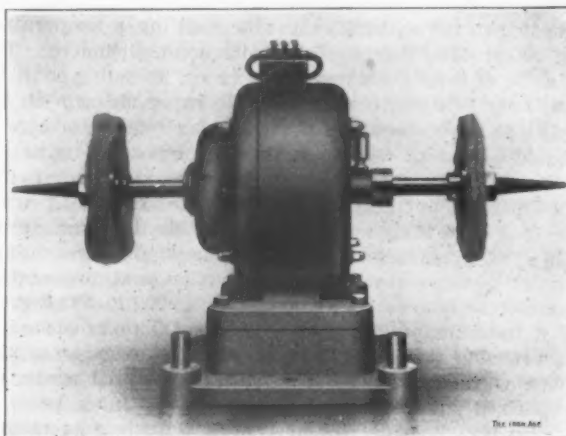
Dr. Richard Moldenke, secretary of the American Foundrymen's Association, P. O. Box 432, New York City, has issued an announcement stating that the annual convention of that association will be held on Tuesday, Wednesday and Thursday, June 7, 8 and 9, in Indianapolis, Ind., and on Friday, June 10, in St. Louis. The association is assured a hearty welcome in both cities, and a large attendance is desired. Suitable railroad arrangements will be made, notice of which will be given hereafter. The foundrymen are invited to take their ladies, who will be specially entertained during the convention. The desire is also expressed that the foundry and pattern foremen will be well represented, so that the value of the discussions may reach as far as possible.

The Builders Iron Foundry of Providence, R. I., have recently poured a number of heavy bronze castings, liners for gun carriages, which have withstood the very severe tests of the Ordnance Department of the United States Army, although mixed in the ladle, the crucibles in the foundry not being of sufficient capacity to melt the entire metal necessary for a 900-pound casting. The required tests were 45,000 pounds tensile strength, 30,000 pounds elastic limit and 20 per cent. elongation. The copper was melted

in an ordinary cupola, which was tapped into a ladle. In a crucible was melted 450 pounds of scrap from previous heats. The zinc and tin were melted in the copper in the ladle, and the melted scrap was then added. The results of the tests were: Tensile strength 65,000 to 70,000 pounds; elastic limit 30,000 pounds; elongation 20 per cent. It will be noted that the two latter tests equaled the requirements, while the tensile strength exceeded it from 10,000 to 15,000 pounds. Thirteen castings were required, which were procured from 15 heats.

A Grinding and Buffing Motor.

In shops where electric power is not used, but where alternating current lighting service is available, the little grinding and buffing lathe shown herewith will be found a desirable adjunct. The motor is of the self starting, single phase induction type and is wound to be supplied on alternating current circuits at the common lighting pressure—52, 104 or 208 volts, with frequencies of 60 or 125 cycles per second. A variation



AN ALTERNATING CURRENT BUFFING MOTOR.

of 5 per cent. from these figures will not affect the performance of the motor. The illustration shows the machine fitted at both ends with taper threads and chucks to hold buffing wheels, which are usually made with wooden hubs for this purpose. The chuck and taper screws are removable, and abrasive wheels may be substituted on one or both ends if occasion requires. In consideration of the service for which it is intended the motor has received special attention in the providing of a thoroughly dust proof casing. Naturally the most vulnerable place is the shaft bearing, as it is almost impossible to provide a very tight joint without producing too much friction. In this machine the protection takes the form of a special brass housing on the shaft, in which rubber washers are used to make a tight joint. The motor is shown mounted on a special cast iron sub-base provided with pins, so that it may be set up in any location without being secured to the floor or bench. A similar form of motor for use on direct current circuits is also made by the builders, the Holtzer-Cabot Electric Company, Brookline, Mass.

The Chicago Shipbuilding Company launched the steel passenger ship "Missouri" on March 16 from their South Chicago yards, at 101st street. This vessel was built for the Northern Michigan Transportation Company, and it is the third large steel passenger steamer that has been completed at the same yards, the two former being the "Manitou" and the "Illinois." Following are some of its dimensions: Keel, 225 feet; over all, 260 feet; beam, 40 feet. It is equipped with triple expansion engines, built by the Shipbuilding Company, and Scotch boilers, with Morison suspension furnaces, size $11\frac{1}{2} \times 12$ feet, 180 pounds pressure. These boilers are equipped with Ellis & Eads induced draft. The plate at the keel line weighs about 30 pounds to the square foot, and from there upward the weight of plate is decreased until about 10-pound plate is used above the water line.

Notes on the Behavior of Zinc in the Blast Furnace.

BY JOHN J. PORTER, BUENA VISTA, VA.

Many of the iron ores of the Alleghany Mountains in Virginia contain small quantities of zinc, the amount varying from 0.10 to 0.60 per cent., and this element is a subject of much execration by the furnacemen of this district. There is, however, considerable difference of opinion as to the extent of its malevolence, some claiming that it has but little effect on the furnace, while others make it the scapegoat upon every possible occasion. This diversity of views, and also the occasional use of zinc as an excuse for bad furnacing, are largely brought about by the difficulty of knowing positively when a "zinc slip" has really occurred, and render desirable a more accurate knowledge of its behavior in the furnace.

The reactions of zinc in the blast furnace are briefly as follows: Introduced in the form of oxide with the ore the zinc is not reduced until well down into the fusion zone, as the reaction $\text{ZnO} + \text{C} = \text{Zn} + \text{CO}$ requires, according to the authorities on zinc smelting, a temperature of about 1320 degrees C. for its accomplishment. The zinc is, of course, liberated as a vapor, its boiling point being only 1090 degrees C., and this vapor rising with the gases to the cooler zones of the furnace condenses there to liquid globules. Some of these globules becoming entangled in the descending stock are carried back to the fusion zone, but only to be revaporized there and again started upon their upward journey. In this manner the zinc finally reaches the upper regions of the furnace, and in its passage through the reduction and preparation zones (the temperature ranging from 1000 to 500 degrees C.), the reaction $\text{Zn} + \text{CO}_2 = \text{ZnO} + \text{CO}$ takes place. It is probable that a portion of this zinc oxide is carried back with the stock, but only to be reduced again, revaporized and reoxidized as before.

By the time the zinc arrives at the stock line it has reached its maximum of oxidation, the temperature here being too low to permit the reaction to take place, while, owing to the large vacant space under the bell, the velocity of the gases is here considerably diminished. This gives the suspended matter a chance to settle, and as the only stationary surface is the stock lining of the furnace, it is evident that here is where we may expect to find any deposits. In point of fact we do find that a ring consisting mainly of zinc oxide forms just below the point at which the stock strikes the lining, being thickest on the side opposite the downcomer. This deposit, or "cadmia," as it is called, is exceedingly hard and heavy, of a greenish gray color, and will analyze about as shown in the accompanying table. The hardness which so characterizes it is most plausibly explained on the supposition that the zinc oxide (which must have originally deposited as a very fine dust) undergoes a molecular change under the influence of the continued high temperature, and passes into a compact crystalline state similar to the mineral zincite. The hardness four and one-half on Mohr's scale, and the specific gravity 4.96 per cent., correspond closely with those of the naturally occurring mineral, and additional probability is lent to this theory by the fact that under the microscope small yellow hexagonal crystals of zinc oxide may be plainly seen in portions of the "cadmia."

Average Composition of Zinc Deposits.

	Furnace "cadmia." Per cent.	Downcomer "cadmia." Per cent.	Flue "cadmia." Per cent.	Flue dust. Per cent.
Zinc oxide.....	89.5	87.0	76.9	26.8
Metallic zinc.....	0.5	0.3	None	None
Silica	2.9	3.4	9.8	35.9
Iron and aluminum oxides	4.7	6.4	8.7	30.1
Calcium carbonate.....	1.5	1.9	3.7	5.6
Magnesium carbonate....	0.4	0.5	0.9	1.6
Carbon	0.5	0.5	..	..

The greater portion of the zinc oxide, however, does not deposit in the furnace, but passes on into the downcomer and flues. The "cadmia" formed in the downcomer is much like that in the furnace, the specific gravity, 4.94 per cent., being only a trifle less, and the analysis as given in the table. It will be noticed that the percentage of metallic zinc is considerably less here, as might be ex-

pected, owing to the great density of the metal causing it to settle out first. The deposits in the gas flues consist of fine dust mingled with hard lumps of "cadmia," the composition of each averaging about as shown in the table. Large quantities of zinc also pass over into and are deposited in the stoves, boilers and chimney flues, while a further amount goes up the chimney stack and is wasted into the air.

The absorption of the zinc by the brick lining of the furnace is another of its rather peculiar properties. This absorption varies according to the position of the brick in the furnace, being greatest at the hearth and becoming scarcely appreciable above the fusion zone. Samples of an old furnace lining taken from the hearth walls had lost the original structure of the brick, and were soft and black through the deposition of carbon; they contained about 49 per cent. of zinc oxide, and showed in places the greenish color as well as the small yellow crystals characteristic of the "cadmia." Samples of the same lining taken from just above the mantle contained about 25 per cent. of zinc oxide, were blue in color, and retained, for the most part, the original structure of the brick. Neither sample contained any zinc in the metallic state.

In making a quantitative estimate of the final distribution of the zinc many difficulties are encountered in obtaining anything more than a very rough approximation. At one furnace during a run of six months the following results were obtained:

Used in the furnace 28,746 long tons of zinc bearing ore, containing an average of 0.63 per cent. of zinc, equal to 202.8 short tons of zinc.

Zinc accounted for:	Short tons.
In flue "cadmia".....	56.5
In downcomer "cadmia".....	18.2
In furnace "cadmia".....	16.6
In flue dust (approximate).....	18.3
In dust catcher dust (approximate).....	16.0
Absorbed in hearth lining (approximate).....	7.1
Absorbed in lining elsewhere (approximate).....	10.0
Lost with gases wasted at furnace top (10 per cent. waste)	18.6
Total accounted for.....	141.3
Difference unaccounted for.....	61.5

The zinc represented by this difference is distributed through the stove dust, chimney flue dust, deposits in the combustion chambers of the boilers, and in the gases passing into the atmosphere through the chimney stack.

Let us now consider the influence of the zinc upon the working of the furnace. It is evident at the outset that the minute quantity introduced with the ore can have no perceptible effect while it remains in its original finely disseminated state, and it is only the action of large pieces which may become detached from the "cadmia" at the top of the furnace which we need consider. Such masses of zinc oxide might act in three ways: 1, Through heat absorption; 2, through chemical action on iron and slag; and, 3, through mechanical action. We will take up the heat absorption first.

One pound of zinc oxide falling from the stock line to the fusion zone will absorb a quantity of heat equal to the specific heat times the increase in temperature, or, say, 0.13 times 1200 = 156 calories. The reaction $\text{ZnO} + \text{C} = \text{Zn} + \text{CO}$ absorbs 695 calories, obtained as follows: $\text{ZnO} = \text{Zn} + \text{O} = -1314$ calories (Thomsen) for 1 pound of zinc, or -1051 calories for 1 pound of zinc oxide; and as $\text{C} + \text{O} = \text{CO} = +2404$ calories, the 0.148 pound of carbon utilized in the reaction evolves 356 calories, and the net result thus becomes -1051 + 356 = -695 calories. In a similar manner the net result of the reaction $\text{Zn} + \text{CO}_2 = \text{ZnO} + \text{CO}$ is found to be +211 calories. As this oxidation takes place in the upper regions of the furnace the resulting carbon monoxide is not reoxidized, and no heat is recovered from that source. The loss of heat due to the fusion and evaporation of the reduced zinc is canceled by the heat evolved by its condensation and solidification in the higher regions, and hence may be ignored for the present. Combining now the quantities obtained, we have -156 - 695 + 211 = -640 calories as the net heat absorption due to 1 pound of zinc oxide.

Assuming that 1 pound of coke yields 3800 calories in the blast furnace, 1 pound of zinc oxide requires $\frac{640}{3800}$ or 0.1684 pounds of coke, supposing that it descended only

once. As pointed out before, however, a portion of the zinc will become mechanically entangled in the stock and be brought back to the fusion zone again and again. For this reason it is impossible to estimate the amount actually reduced, but considering the fact that the zinc is reoxidized only in the upper zones of the furnace, it should be so thoroughly distributed before again reaching the fusion zone as to have practically no effect on the furnace. As the "cadmia" in the furnace top frequently attain a weight of from 15 to 20 tons, the falling of masses of 1 or 2 tons in weight is not infrequent. A mass of 1 ton would cause a minimum heat loss of 1,280,000 calories, equivalent to a coke consumption of 337 pounds, within a tolerably short space of time after first reaching the fusion zone, the remainder of the heat loss, due to the redescend of the zinc, taking place over a much longer period of time.

Besides the actual absorption of heat there is also a transfer of heat from the fusion zone to the higher regions, due to the evaporation of the zinc and its condensation higher up. The latent heat of evaporation of zinc has, to the best of my knowledge, never been determined, but it can hardly exceed 200 calories, and at this figure the coke consumption necessitated by the volatilization of 1 ton of zinc would be only 105 pounds. It will be readily seen from these calculations that the loss of heat caused by a fall of zinc would be, as a rule, comparatively small and quite insufficient to account for all the evils charged up to it.

The chemical reactions of zinc with the iron and cinder in the furnace are rather obscure, and it is very doubtful whether any take place. Among some furnacemen it is customary when the furnace is working badly to send a sample of the cinder to the chemist, and if he reports a trace of zinc in it to regard this as proof that the trouble is due to a zinc slip. The writer has tested many samples of cinder for zinc, and has found traces of the metal in practically all of them (the furnace burden containing zinc bearing ore), but in no case did the amount exceed 0.05 per cent. In two cases where the neck of the downcomer had been cleaned, and it was known positively that considerable amounts of the "cadmia" had fallen into the furnace, samples of cinder taken after the proper interval had elapsed and analyzed contained no more zinc than other samples from a perfectly normal furnace.

It is obvious that we need expect to find no zinc in the iron, the high temperature causing its immediate volatilization, and the presence of carbon insuring the reduction of any oxide. In the case of large lumps of "cadmia" coming down it is possible that unreduced portions might reach the hearth bottom and cause an appreciable loss of carbon to the iron there. On the two occasions previously spoken of when the downcomer neck was cleaned the total carbon was determined in the four casts immediately following, but in neither case was there any marked diminution in the percentage. This, however, does not prove absolutely that no loss could take place under other conditions, the "cadmia" in this case being in comparatively small pieces, which would be much less likely to descend unreduced through the fusion zone than larger masses. The probability of a serious loss of carbon from this source, however, would be very remote, and for all practical purposes the chemical action of zinc on iron and slag may be taken as *nil*.

There remains now only the mechanical action of the zinc to be considered. The deposits of "cadmia" in the downcomer and flues cause much trouble through the choking up of these passages and the consequent raising of the blast pressure. At one furnace, using an average of 80 per cent. of an ore containing about 0.60 per cent. of zinc, it was found necessary to wash out the flues every two or three months, and cut out the "cadmia" from the neck of the downcomer every two or three weeks. When the removal of this "cadmia" was neglected for a month the usual result of cutting it out was a fall of from 1 to 2 pounds in the blast pressure. In the same furnace after a run of six months the deposit of zinc oxide at the stock line was found to be some 2 feet in thickness at the top on the side opposite the downcomer, tapering off for a depth of about 8 feet and weighing about 25 tons. This deposit must have interfered seriously with the dis-

tribution of the stock, sending the lump ore to the center, and more to one side than the other. Owing to the extremely hard nature of these "cadmia" their removal from stock line or downcomer without first blowing out the furnace is by no means an easy task.

It is interesting to note the effect of varying furnace lines upon the deposition of zinc at the stock line, some furnaces showing a much greater tendency to form deposits there than others. The following table gives the essential data for four furnaces, in which the formation of "cadmia" in the top was greatest in A, somewhat less in B, still less in C, and smallest in D, the ore mixture used being approximately the same in each case:

	Height Feet.	Diameter of bosh. Ft. In.	Ratio of height to bosh diameter.	Diameter at stock line. Ft. In.	Total area. Sq. in.	Average blast pressure. Pounds.
A.....	70	15	4.67	12 3	166	8½
B.....	76	13 3	4.53	10	75	7
C.....	75	17 6	4.29	12	170	7
D.....	63	15 6	4.26	12	100	6½

From this table it can be seen that the size of the "cadmia" does not vary inversely as the velocity of the gases at the stock line, as might be expected, but rather increases with the ratio of height to diameter. It is claimed by some that the deposition of zinc oxide does not begin until the gases have cooled to a certain temperature, the point at which this temperature is reached depending on the height of the furnace. The writer can assign no reason why this should be so, nor has he ever heard any explanation given. As observations of the temperature of the furnace gases were not taken at these furnaces, no positive conclusions can be drawn, but the facts so far as known certainly tend to show the truth of this statement.

In conclusion it might be stated that this cloud is not without its silver lining, the "cadmia" bringing a good price when sold to the zinc smelters, and the writer has known of occasions when more money could be made by blowing out the furnace and removing the zinc therefrom than by keeping it in blast and making pig iron.

Progress of New York Subway Work.

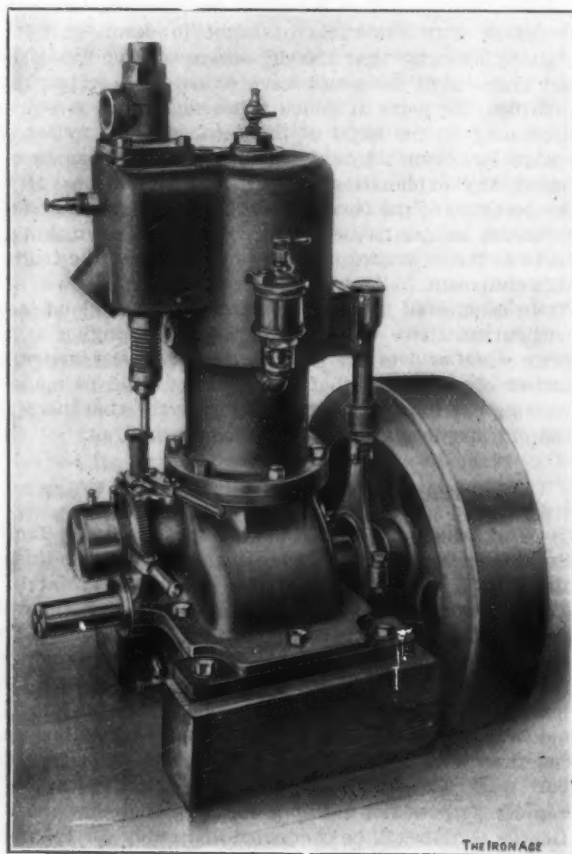
Workmen on the west side branch of the Rapid Transit Subway in New York City broke through the headings of the Fort George section on the afternoon of March 19. This event marked the completion of a very important work in the opening of the tunnel on both branches from the City Hall to the northern terminals. Connection was made at 190th street, practically half way between the end of the section which runs from 181st street to Hillside avenue and Dyckman street. The two headings came together with gratifying exactness. The masonry and rail work have been following the boring operations as rapidly as possible, and it is now asserted that the Fort George section will be completed and ready for the operation of trains inside of three months. The plans of the subway managers contemplate the opening of traffic in June for trains as far north as 157th street on the west side branch, and 141st street on the east side branch. The tunnel under the Harlem River, through which the east side branch will run, will not be completed for at least three months.

The King Lubricator & Brass Supply Company.—

The King Lubricator & Brass Supply Company have been organized at Steubenville, Ohio, with a capital of \$50,000 instead of \$5000, as recently stated. The company are erecting a plant at Steubenville, Ohio, for the manufacture of the King lubricator, and 14 other specialties. The Baird Machinery Company of Pittsburgh are equipping the plant with engine lathes, turned lathes, drill presses, and other iron working machinery. The Brown & Zortman Machinery Company of Pittsburgh are installing the binders, belts, wheels, &c., while the Dayton Gas Engine Company are installing a 25 horse-power New Era gas engine. The company are now occupying temporary quarters. The officials are E. M. Fisher, president; H. S. Blynt, vice-president and general manager; B. F. Fisher, secretary, and H. L. Wilson, treasurer. J. B. Clark, formerly of the La Belle Iron Works, is general sales manager.

The Royal Gasoline Engine.

The accompanying half-tone illustrates a reversible 3 horse-power 4-cycle marine engine of the medium compression type recently brought out by the Royal Equipment Company, Bridgeport, Conn. The reversing device, the principle of which is shown in the line drawing, Fig. 2, is a feature entirely new in a 4-cycle engine, and allows a solid propeller to be used without a reversing gear. It consists of two cams placed on the second shaft, which is geared from the main shaft, and arranged to operate the exhaust valves. Between the exhaust valve stem B and the cams C there is a foot sliding through a guide, D, by which the foot may be moved from one cam to the other by means of the lever A. The cams are on one casting, E, which is positioned on the shaft so as to cause the valves to operate at the correct time, producing forward motion when the foot is in contact with the outer cam F and reverse motion when moved to the inner



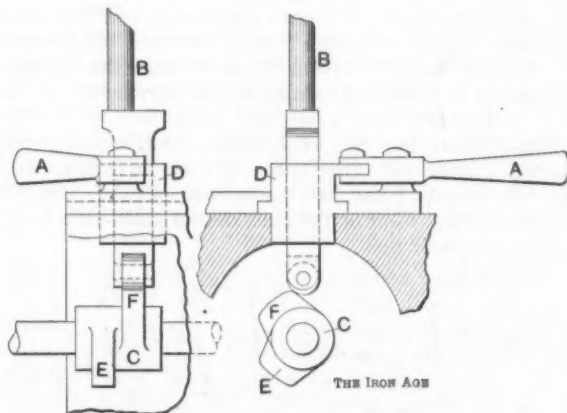
THE ROYAL GASOLINE ENGINE.

cam F. The reverse may be accomplished without touching the fly wheel by opening the igniter switch and allowing the engine to slow down, and when it is about to stop moving the foot to the opposite cam and closing the switch again.

The general features of the engine shown are in accord with the accepted design desirable in types of its size. The cylinder, head and valve chamber are in one casting, so that there is no packing under pressure and the whole is completely water jacketed. The circulating pump is directly attached to the cylinder, obviating the use of piping, and, being of the plunger pattern, insures a positive circulation of the jacket water. The ignition is by jump spark, the time of which may be varied. A late spark is used in starting to prevent the engine from "kicking," and as the speed accelerates the spark may be advanced to the most suitable point. The engine may also be supplied with the make and break system of ignition when desired. Since the base is made tight, it is adapted to the use of splash lubrication, but a sight feed lubricator may be supplied if preferred. The cylinder has a 4-inch bore and a 5-inch

stroke. The normal speed is 600 revolutions per minute and the total weight 235 pounds.

The marine type of engines is made in sizes of from 3 to 12 horse-power in one, two, three and four cylinder form. The Royal Equipment Company also build sta-



Detail of the Reversing Device.

tionary engines 3 and 6 horse-power in size and automobile engines from 5 to 20 horse-power, on which the crank cases are made of aluminum.

The New York Car Wheel Works.—A further hearing in the affairs of the New York Car Wheel Works was given in the bankruptcy court at Buffalo on the 18th inst., at which time P. H. Griffin, the former president, was examined relative to an item of about \$600,000 which, according to the books of the Car Wheel Works, appears to be due the defunct company from the P. H. Griffin Machine Works, a concern dominated by Mr. Griffin. The accuracy of this charge on the company's books is disputed by Mr. Griffin, who claims to have turned over to the Car Wheel Company moneys and securities which would more than offset the charge, but that no credit had been given for same on the books and in this respect the books are wrong. Mr. Griffin states that every effort was made by him to save the company from bankruptcy, but that for some time prior to the failure of the company he was not active in the management of the business, although still nominally its president, the control of the company's affairs having been assumed by a committee of the creditors, who he claims are responsible for whatever entries have been made in the books and the manner in which the accounts have been kept from the time the creditors took charge in the fall of 1901. The former secretary-treasurer of the Car Wheel Company—who afterward acted for the committee of the creditors—testified, however, that the charge as it appeared upon the books was correct, and that all moneys and assets turned over to the company by Mr. Griffin had been properly credited. It is therefore probable that the referee in bankruptcy will demand the presentation of an analysis of the account between the New York Car Wheel Works and the Griffin Machine Works to aid in a proper decision of the matter, and a further hearing has been set for April 4.

No Change in Coal Carrying Rates.—At a meeting of the Western Pennsylvania and Eastern Ohio Railway Carrying Association, held in Pittsburgh last week, it was decided to make no change in coal carrying rates. The present rate on cargo coal for upper lake ports from Pittsburgh is 83 cents per ton, while the rate on fuel coal is 93 cents per ton. The coal operators requested that the rate on cargo coal be reduced to 73 cents per ton to Lake Erie ports, the rate in force in 1902, and that fuel coal be reduced to 83 cents per ton. Other arguments were advanced by the coal operators favoring a reduction in the rates, but after discussion of the matter the railroads decided not to make any change and present rates will continue in force.

Causes of the Darlington Hotel Collapse.

On page 42 of the last issue of *The Iron Age* we printed an advance copy of practically the entire report of H. de B. Parsons, who has been retained by the District Attorney's office of New York to investigate and report upon the causes of the recent collapse of the Hotel Darlington structure in New York. This report has since been submitted to the District Attorney, together with drawings and models illustrating the points brought to light by Mr. Parsons.

The report, it will be recalled, stated that "the primary causes for the failure of the structure were faulty design and carelessness and neglect in the erection of the members. The actual cause of the collapse was the

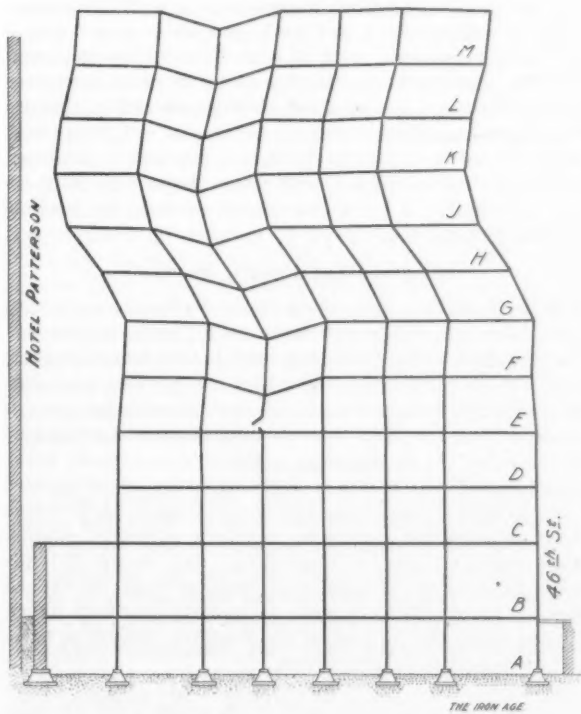


Fig. 1.—Side Elevation of the Steel Frame, showing in slightly exaggerated form the failure of the column on the fourth floor, resulting in the collapse of the structure above it, which crashed through the lower portion of the building. The break occurring just back of the center of the floor, the structure had a natural tendency to fall toward its center, the greater amount of metal in the front, however, pushing the rear portion backward.

lack of lateral support for the columns, which permitted them to act as 'long columns'—that is, the ratio of length to least radius of gyration exceeded the limit of safety."

Supplementary to our description of the construction of the structure Mr. Parsons states:

"Each floor was lettered and the columns varied in size on the same floor, a specimen schedule being as follows: "

Floors.	Letter.	Column.		Hight.
		Side.	Thickness.	
		Inches.	Inch.	Ft. In.
Basement	A	9	1	10 6
Ground	B	9	3/4	14 6
2	C	8	3/4	10 10
3	D	8	3/4	10 10
4	E	7	3/4	10 10
5	F	7	3/4	10 10
6	G	6	3/4	10 10
7	H	6	3/4	10 10
8	J	6	3/4	10 10
9	K	6	3/4	10 10
10	L	6	3/4	10 10
11	M	6	3/4	10 10
12	N	6	3/4	10 10

Hight to under side of roof beams.....144 2

In describing the cause and action of the collapse, the latter being excellently illustrated in Fig. 1, Mr. Parsons says:

Cause of Fall.

"Practically the building was pin connected. The bolts fastening the girders and beams against the column lugs were of smaller diameter than the holes, so that the columns received little or no lateral support. The column lengths were bolted together at top and bottom, and acted as continuous columns. All loads were eccentrically supported on the side brackets. In consequence, the columns were too long to carry the superimposed weight and buckled. One column situated at or near the 'center of fall' broke. The upper parts of this column being deprived of its support fell, and pulled with it the floor members bolted to it. Each of these floor members pulled over the adjacent columns to which the other ends were attached, and these columns having no lateral support broke at the lower flange, as the pull had a lever arm of about 10 feet, or the length of the column. This action and reaction of the stresses affected only the structure above the level of the original fracture. In fall, the mass of material from above crashed down and broke that part of the structure below the level of the original fracture.

"The exterior columns did not break off as low down as the interior columns, because the mass fell away and

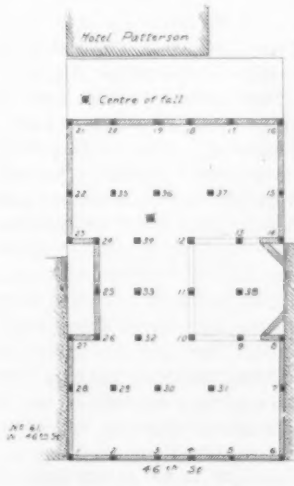


Fig. 2.—Floor Plan, showing the location of the cast iron columns according to their proper numbers, and indicating the "center of fall" slightly to the rear and left of the center of the building.

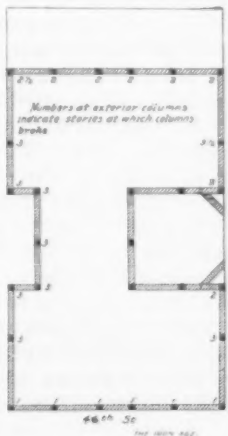


Fig. 3.—Floor Plan, showing the location of the cast iron columns in the outer walls, and indicating the stories at which these columns broke. The inside columns were practically all broken off at their bases.

did not crush them as it did the interior ones. The uniformity in height at which the exterior columns broke strongly indicates that the primary fracture occurred at or about the level of the fourth floor.

"As proof that the top fell into and toward the 'center of fall' before the lower part of the structure collapsed, columns G 11 and K 11 were taken out of the debris near the 'center of fall' and from beneath other members, which originally were connected at points lower down in the building. Near the same spot column D 36 was found standing in a nearly upright position. Of these columns, the first was broken at the center and the other two at the flanges. Furthermore, as more of the structure was south of the 'center of fall' than north of it, the northern, or rear, portion was forced outward against the Hotel Patterson."

As shown in Fig. 3, the columns in the outer wall broke off with approximate uniformity between the second and third floors, although the floor systems of the stories below and the interior columns (except some in the basement) were carried away, leaving the outer columns standing from their foundations to the points of rupture. The columns showed by measurement to have variations as to thickness of metal on the opposite side of 1/8 inch or less.

Notes on the Packing of Machinery for Export.*

BY PAUL ROUX.

An American machine has much to pass through between the producing factory and its final arrival at the works of the purchaser: cartage, transportation by rail and by sea, transshipment, loading and unloading, Custom House examination, and, perhaps, storage for considerable periods in French warehouses.

Packing comprises the series of operations which have for object the preservation of the machine in good condition up to the time of final delivery. The care with which these operations are carried out, and combined, may not only largely affect their own cost, but also the expenses of transportation, custom dues, and storage, and these expenses, in the case of machinery exported from the United States to France, may amount to a considerable percentage of the selling price.

Preparation of Machines.

All machine tools after having been completely assembled, inspected and tested in practical running should be more or less completely dismantled before packing. It is impossible to lay down fixed rules in this regard, as the extent to which a tool should be dismantled varies with each machine, or, rather, with each class of machinery. The manufacturer must take into consideration the resistance of the tool and its various parts to rough handling in transportation, and decide upon to what extent it should be dismantled to insure safety. It must be remembered that while the packing case will protect a machine against blows which it may receive when in a normal position, it offers little protection against side or abnormal thrusts resulting from an overhanging position. Great care must therefore be taken to see that no part of a machine is in contact with the sides of the case—that is, not fully able to withstand the rough handling to which the case can be subjected. The feet of a lathe bed, the base of a shaper, or of a milling machine may be readily broken by the packing case falling, even lightly, on one of its corners, and without the latter showing any external evidence of the fall.

A most important consideration to be taken into account when dismantling a machine is its volume or cubage when packed for shipment. Marine freights are generally reckoned at so much per ton weight, or per 40 cubic feet, at the option of the ship. The exporter has, therefore, every interest to see that the weight, which cannot, of course, be varied, does not occupy a space greater than 40 cubic feet per ton. Nearly all machines when not dismantled make up into packages greatly exceeding 40 cubic feet per ton, and even under the best conditions can rarely be packed in cases equivalent in weight and volume. It may therefore be laid down, as a general rule, that every effort should be made to reduce the volume as much as possible by dismantling all projecting parts which increase the over-all dimensions of the packages. On the other hand, the difficulty of assembling parts requiring accurate adjustment must be taken into account, and the exporter must use his best judgment in deciding at what point the difficulties of setting up the machine will outweigh the economy realized by reducing the volume of the package.

This question of reducing the cubage is worthy of the closest attention of American manufacturers, as the freight from the United States to French ports is extremely high by the direct lines, while the extra duties charged upon goods arriving indirectly more than counterbalance any savings in transportation charges. The cost of transportation is, therefore, an important factor in the cost of a machine when delivered in France, and the economy realized by paying close attention to the volume of packages may form an appreciable portion of the profits.

The maximum weight of each package must also be carefully considered. Freight charges, computed, as has already been shown, according to weight or volume, as may be more profitable to the carriers, are increased very

considerably when the weight of individual packages exceeds a certain limit. For instance, the rate for packages exceeding $4\frac{1}{2}$ tons in weight is double that for packages weighing less than 2 tons. This increase varies according to the steamship line, but is imposed by all, and must therefore always be taken into account.

In addition to its effect on the actual freight charges, the total weight per package when exceeding a maximum of about 2 tons involves extra charges for loading and unloading. These charges vary according to the equipment of the ports of departure and arrival, and are often very considerable, as it may be necessary to move the vessel under a dock crane, when one is available, or to get up steam on a floating crane to handle the heavy weights.

To sum up, it will generally be advantageous to dismantle a machine weighing over 2 tons in order to pack it in several packages, each weighing less than this maximum. Care must be taken, however, that the total tonnage or cubage of the several packages does not exceed that of a single case, and that the difficulties of assembling the machine at destination do not more than counterbalance the economy realized on transportation charges. It is also profitable to dismantle a machine weighing either more or less than 2 tons when this secures a considerable reduction in volume, and when, as is generally the case with machine tools, the cubage exceeds the limit of 40 cubic feet per ton.

Dismounting Fragile Parts.

It is generally necessary to dismantle fragile projecting parts, even when this will have no influence on the volume or weight of the packages. While it is true that these parts will be properly protected by the packing case during transportation, still they run the risk of being bent or broken during the operations of unpacking and setting up the machine. It is therefore preferable to remove them, and to pack them in one or more separate boxes secured in the principal case. All delicate or fragile parts which cannot be removed should be carefully protected against rough handling during unpacking. All screw threads should be carefully covered with wood or rags; all tapped holes, oil holes and, in general, all openings through which dirt can reach the interior of the machine should be carefully closed with wooden plugs.

Manufacturers are especially urged to tag all pieces which may have been removed with labels fully explaining their position on the machine. This precaution may appear exaggerated and useless if it is considered that the machines will only be assembled by mechanics understanding their construction, but certain American machines are novelties to many factories, and, besides, before arriving at the works of the purchaser, the machine has to pass through the Custom House, and sometimes to be exhibited in a salesroom. Under these conditions it is necessary that people unfamiliar with the type of machine should know exactly the position and function of each of the detached parts.

Preservation.

When a machine tool has been properly dismantled and divided for packing the very important operation of protecting the finished parts against rust must be carried out. Lack of care and attention in this operation may have very serious consequences. It is not necessary to point out what serious effects rust may produce on the finished parts of a machine; it should be remembered that after having passed three or four weeks *en route*, often badly protected from the rain, and always subjected to the effects of dampness, a machine may remain during long months in warehouses before being unpacked, and it is easily seen in what condition a machine may be found if the finished surfaces have not been protected against rust by a thoroughly efficient coating.

There are two things to be considered in this question of protection—the nature of the protective coating and the method of applying it. Without stating what the composition of the coating should be, it is urged that this should be sufficiently fluid at the time of application to permit it to reach all parts of the surfaces to be covered; that it should be entirely free from all trace of acid, in order that it may not attack the metal. It should dry very rapidly, in order that no surface should be exposed

* Paper contributed to the American Chamber of Commerce, Paris.

accidentally through chafing *en route* or careless handling in the Custom House. It should be readily dissolved with oil, petroleum or turpentine when the machine is ready to be set up at its final destination.

The coating should, of course, be applied carefully to all polished surfaces which can be reached by the atmosphere, and care should be taken that the coating is intact after the machine has been packed—that is to say, when the packing case has been constructed around the machine. It very often happens that the packers carefully coat all polished parts of a machine, but that more or less of the coating is removed during the handling necessary for placing the machine in its packing case, or by contact with the interior braces. The effects of this negligence are generally very serious, because the parts thus exposed are promptly attacked by rust, and the machine cannot be put in perfect condition, even if this be possible, except by long and costly work.

Polished surfaces which are in contact with each other should not be coated; they will be sufficiently protected by the lubricating oil applied for running the machine. Likewise oil holes should be free from the coating composition, as it is most difficult to completely remove it later on. Finally, it is recommended that this coating be not applied to any finished parts which, by their position in the machine, are completely protected from all exterior contact, and which are so situated that the removal of the protecting coat would be difficult. For these parts the employment of vaseline or solidified oil is suggested, as this can be readily removed, and, even if not removed, cannot affect the working of the machine. The only precaution to be taken is that the vaseline and oil should be entirely free from acid. As an example, inclosed gearing, such as in the head stock of a lathe, can be protected in this manner against rust. Vaseline or solidified oil may also be employed for protecting such small detached pieces as may be inclosed in a separate box.

Packing Cases.

The packing case must fulfill two requirements: it must effectually protect the machine against all shocks and injury during transportation, and must facilitate the handling of the machine—that is to say, that the packing case is at the same time a covering and a vehicle. In order to fulfill this double requirement the case should be specially constructed, and, without fixing general rules, as the details of construction will vary considerably with the forms of different types of machines, the essential requirements will be given for packing cases containing a machine which is of a weight too great for moving by hand.

The bottom is the most important part of the case, considered as a vehicle. If this is well designed it will not only facilitate handling during transportation from the United States to France, and contribute greatly to removing risk of injury, but it is the only part of the case which can be utilized in France, if, after remaining in showrooms, it is to be shipped by rail to its final destination. The bottom should therefore be sufficiently strong to carry the total weight of the machine, without the assistance of any other part of the case, when balanced on a roller. It should be constructed with two longitudinal battens, in order that the case may be moved on rollers when cranes are not available, and these battens should be beveled at the ends to facilitate their employment. Transverse planking, spiked to the battens, forms the bottom of the case. On the bottom, constructed as indicated, two frames should be built around the machine, dividing the length of the case in three parts, in such manner as to support the pressure of ropes or chains when handling with cranes or other hoisting apparatus. These frames will, at the same time, act as supports for the interior braces, and as lateral supports in case the package is laid on its side, which often happens in spite of instructions. Around these principal elements are built the sides, ends and top of the case, which are designed simply for protecting the machine generally. In constructing the packing case the remarks already made regarding its volume must be borne in mind. This volume is computed from the over-all dimensions, and often a bolt head or a batten badly placed will largely increase the cubage.

In designing the packing case it is very necessary to

make provision for the examination of the machine in the Custom House, and even for removing it completely. It is absolutely necessary in all events to arrange an opening in one of the sides or in the cover, through which the nature of the machine may readily be seen. This opening should be large enough to permit the examination of all parts of the interior of the case, and to permit the passage of a lantern, if required. It should be closed by a cover secured with screws.

To allow for removing the machine completely from the packing case, in order to determine the net weight of the machine for the Custom House, it should be arranged so that the packing and the unpacking may be readily and rapidly accomplished, without it being necessary to injure the panels. For this it is necessary that the top and one of the sides be secured with screws instead of nails, and that the position of the interior battens and braces be indicated externally, in order that the screws and nails fixing them may be readily found.

It is especially recommended that the interior of packing cases be not lined with paper. Such a lining prevents the circulation of air, and if the machine be packed in a damp atmosphere the humidity, which under other circumstances would have evaporated, will attack the metallic parts wherever exposed ever so slightly. Special attention is called to this point, as practical experience has demonstrated that effects have resulted from lining cases quite unforeseen by the exporter.

Lists and Drawings.

It is very necessary that the machine should be accompanied by a detailed list of the detached pieces contained in the packing case, which, on unpacking, will show whether any part has been lost during transportation or during the Custom House examination. It is most indispensable that this list should be accompanied by a drawing or cut showing clearly the machine when assembled and ready for work. This cut should also show all accessories which are indispensable to the machine: for example, countershafts, keys and wrenches, change gears and so forth. This cut, in lieu of which a drawing should be supplied, will permit the Custom House inspectors to convince themselves that the detached pieces actually form part of the machine; otherwise, these pieces may have to pay duties at a higher rate than the machine itself. If the machine has been taken apart and made up into several packages, a cut or drawing should be placed in each case, as in general all of the packages are not opened in the Custom Houses.

These papers, lists, cuts and drawings should be carefully enveloped in water proof paper, and tacked inside the case near the small opening already mentioned, in order that they may be readily accessible. When the dimensions are such that the papers can be attached to the cover of the opening, this should be done.

Exterior Marks.

Once the packing is finished, it only remains to properly mark the cases for identification. All manufacturers know that a case should be marked legibly with identifying marks and numbers, the gross and net weight, the volume and the name of the port of discharge, the latter in legible lettering at least 2 inches in height. It is only necessary to call their attention to the necessity of marking the absolutely exact net weight, as even a very small difference between the weight stated and the true weight may cause difficulties in the Custom House, and, perhaps, the imposition of fines. The volume is determined by taking the three dimensions over all. In addition to these marks, indispensable for the transportation of the package, and which should, when possible, be placed on the sides of the case, it is recommended that on each end of the package a short designation of the contents be added. These last named inscriptions are absolutely necessary when the package is to be stored in a warehouse, as they permit of the immediate identification of a case containing a given machine. These inscriptions should not only indicate the type of machine, but should also give its size or number.

Finally, exporters are urged to paint a black circle around the heads of all nails and screws which should be removed in order to unpack the machine with the least work and without injuring the panels and bracings.

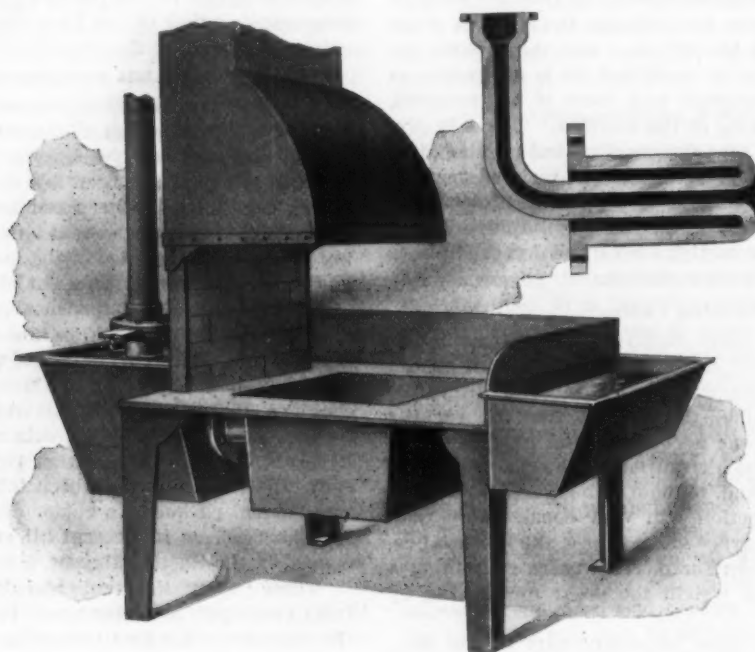
If the bottom of the case has been given the special form indicated above, there is little chance that it will be placed otherwise than upright; it is, however, better to add the usual indications—"top," "bottom" and so forth.

Conclusion.

If the above suggestions are carefully followed manufacturers will greatly diminish the risk of injury or deterioration during transport, and will spare the consignee of the machine and the purchaser in France the trouble, delay and expense which the loss, damage or breakage of an essential part of the machine will cause him. The importance of properly bracing and securing a machine in its packing case has not been insisted upon, as the methods must vary greatly with each type of machine. The manufacturer should know how to so arrange the bracing that the stresses to which the case may be subjected will be properly distributed and only brought to bear on such parts of the machine as may be capable of resisting them.

An Improved Blacksmith Forge.

The forge shown in the accompanying engraving is constructed entirely of cast iron, with the exception of the



THE UNIVERSAL BLACKSMITH FORGE.

hood over the fire, which is made of heavy galvanized iron. A novel feature is the water cooled tuyere, a sectional view of which is given at the upper right hand part of the engraving, and shows the manner in which the water is allowed to surround and fill the exposed part of the tuyere where it projects into the center of the fire, so as to keep it cool and prevent it from burning out.

The main body of the forge is 4 feet long by 3 feet 6 inches wide, exclusive of the water box hung on the left end and the tong box hung at the right. The latter is 3 feet 6 inches long by 10 inches wide and 10 inches deep, and the water box, through which the tuyere passes, is 16 x 20 inches. The surface of the bed plate stands 2 feet 6 inches from the floor and in its center is a fire box 20 inches square, lined with fire brick and connected with the tuyere. A cast iron fire back, protected with fire brick supports the hood and smoke pipe, and the opposite side and back are surrounded with cast iron plates 9 inches wide to retain the surplus coal. For varying the intensity of the heat a draft regulating damper is located in the iron pipe above the top of the water box, where it is within easy reach of the smith. Inasmuch as all the parts are quickly detachable, it may be easily moved or taken down and packed for shipment. The Universal blacksmith forge, as it is called, is built by the Canton Foundry & Machine Company, also proprietors of the Universal Machine Works, Canton, Ohio.

An Important Drawback Decision.

WASHINGTON, D. C., March 15, 1904.—The Attorney-General has rendered an important decision bearing upon a large class of applications which the Treasury Department has received for the allowance of drawback of duty upon articles of foreign manufacture imported in a completed condition and designed to be attached more or less permanently to other articles of domestic manufacture intended for export. The Attorney-General's decision is adverse to the claimant, and emphasizes the importance of the enactment of some such legislation as that embodied in the pending Lovering bill for the liberalization of the drawback laws. The decision is important also as indicating to manufacturers a method by which under the present law duties on imported appliances, separate parts, &c., intended to be attached to goods designed for export may be saved if it is not absolutely essential that the attachment should take place prior to shipment.

The application upon which the Attorney-General's opinion was based was that of the American Car & Foundry Company, who, under a contract with the Government of New Zealand, manufactured a number of cars for which vacuum brakes, rubber springs and Pintsch

light apparatus were imported. These appliances were withdrawn from customs warehouse and assorted into sets, but were not attached to the cars, and were subsequently exported with the cars in one general shipment to New Zealand. Claim for drawback of duty on the imported appliances was based upon the declaration that the contract called for completed cars fitted with the articles enumerated. The Attorney-General, in a letter to the Secretary of the Treasury recommending the denial of this application, says:

Under the contract it was necessary to set up the cars for inspection in this country, and that when inspected there should be present with them all necessary brakes, springs and parts of the lighting apparatus; but it was not required that any of said things should be installed in the cars while in the United States, and they were not, in fact, so placed at any time before exportation. After having been inspected the cars were taken down and the different parts thereof, along with the imported equipment above specified, properly packed; and in this way all were transported abroad on shipboard. The parts of the Pintsch light apparatus were taken out of the packages in which they were originally imported, segregated, inspected and then repacked with the parts of the cars to which they were subsequently to be attached for use. The brakes and springs, having been withdrawn from customs custody, were thereafter sent out in the packages in which they were originally imported as a part of the entire consignment.

Section 3025 of the Revised Statutes provides: "No return of duties shall be allowed on the export of any merchandise after it has been removed from the custody and control of the Government, except in the cases provided in sections 3019, 3020, 3022

and 3026." (The excepted cases do not affect the present question.)

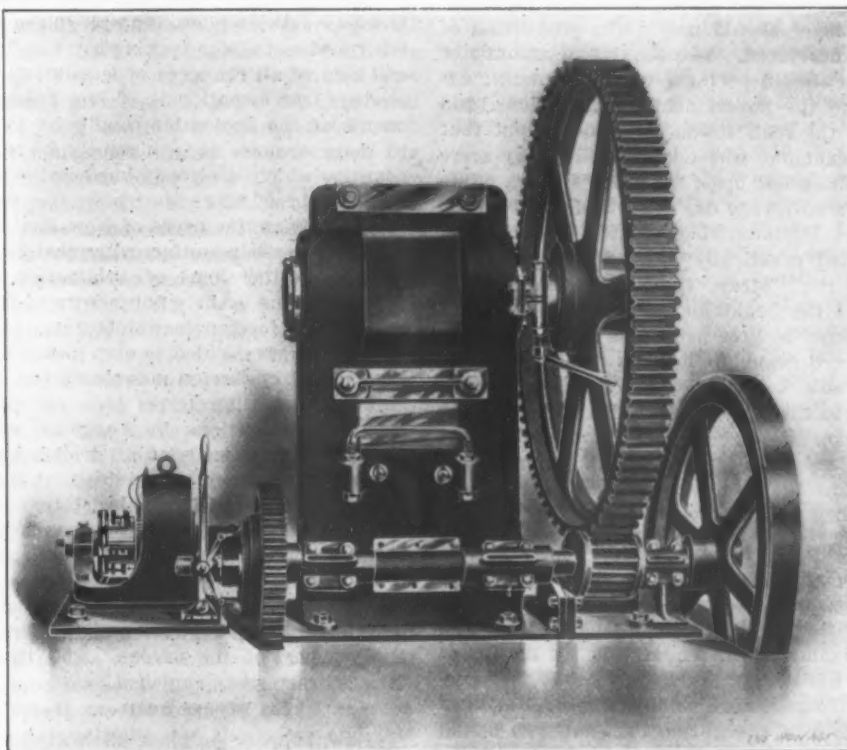
I am of opinion that the brakes, springs and Pintsch light apparatus imported by the applicant were not, in any proper sense of the terms, used "in the manufacture of articles manufactured or produced within the United States," as required by the terms of the act of 1897. And as all such articles were removed "from the custody and control of the Government," no return of the duties paid thereon can now be allowed under any provision of law. I have the honor, therefore, to advise you to deny the application.

The Attorney-General does not indicate whether he would have ruled differently upon this application had the appliances referred to been permanently attached to the cars before their shipment, but that point is not regarded by the Treasury Department as of any special importance, as it has always been found necessary to ship such cars in a "knocked down" condition. Perhaps the most important point developed by this case is the fact that, under the present law, the manufacturers could have saved the duties on all these appliances, amounting to a large sum, if after their importation they had been permitted to remain in customs custody until required for

A Motor Driven Bar and Billet Shear.

The accompanying engraving illustrates a heavy motor driven bar and billet shear recently built by the Doty Mfg. Company, Janesville, Wis. As may be seen, the main frame or housing is cast in one piece and is heavy and substantial in its proportions. The main driving gear has a large diameter, with a wide face, and in its construction special attention was given to insure the proper meshing of the teeth. The fly wheel is also of large diameter, with a heavy rim, to afford sufficient momentum to do the required work easily.

To insure ample wearing surface the sliding head is exceptionally long and has wide bearings carefully fitted in the housing, with means provided for effective lubrication. It is actuated by means of a steel eccentric which is forged in one piece, with the shaft and works in a bronze sliding box. The shaft is provided with a positive jaw clutch and automatic stop of an approved type, which causes the sliding head to stop at the top of each stroke unless the lever is kept depressed when the machine runs



THE NEW DOTY BAR AND BILLET SHEAR.

export. The Treasury Department would have issued a permit under which the goods could have been unpacked, examined and repacked in the same cases, and thus the inspection called for by the terms of the contract with the New Zealand Government could have been complied with.

W. L. C.

The American Tool Works Company, Cincinnati, have through purchase acquired manufacturing rights under the several patents which have been issued pertaining to such devices. This gives them the right to build their new "American" engine lathe, with quick changing mechanism for thread-cutting and feeding. The lathe has previously been shown in these columns. The line of sizes in which this lathe is built ranges from 14 inches to 36 inches, inclusive, and full information on any size will, we are confident, be cheerfully furnished by the makers.

Two handsome pamphlets which have been issued, entitled "The Yampa Coal Field, on the main line of the Moffat Road," and "The Hydrocarbons of the Moffat Road," contain the reports of W. Western. They deal with some of the mineral resources of the projected Denver, Northwestern & Pacific Railway.

continuously. This allows for careful shearing to line or to gauge.

The motor is direct connected and drives the pinion shaft through cut gearing and a friction clutch. The pinion shaft is of steel and is mounted in inclined bearings on the front near the base, so that it may be removed without disturbing the gearing. For various classes of work interchangeable blades are supplied, which may be quickly detached and replaced. This machine is built in several sizes, and is claimed to be a very efficient tool for all kinds of bar and billet shearing.

Word comes from Bangor, Maine, that prominent lumbermen of that section have organized to develop large water power at what is known as Marsh Rips, on the Penobscot River, and that surveys for two large concrete dams are being made, with a purpose of building them the coming season. The plan is to develop electrical power, for use in operating pulp mills, and for general use along the Penobscot River. Another water power plan is to develop an unimproved water privilege on the Sebasticook River, in the town of Winslow, Maine. It is reported that two corporations, the Hollingsworth & Whitney Company and the Messalonskee Electric Company are seeking to get control of this privilege.

How Should Organized Labor Be Dealt With?*

BY J. KIRBY, JR., DAYTON, OHIO.

In this country organized labor is of more recent development than it is in England, where, until the inauguration of the great engineers' strike of 1897, it may be said to have reigned almost supreme, and where it had carried its dictatorial policy to such an extent that it was only necessary for it to make demands such as led to that famous strike to bring the employers of England to their senses and to array them in one united body against a movement which was sapping the very vitals of her industrial and commercial interests. So completely had the labor unions throttled the employing classes that a manufacturer could not introduce the manufacture of a new article, or an article differing in any manner from what he had formerly been producing in his establishment, without first submitting the proposed addition or change to the union and obtaining its stamp of approval. Not only was this so, but organized labor even went so far as to dictate the class of machines and tools the employer should use in the production of the goods he manufactured. The maximum amount of work an employee should perform was also almost exclusively subject to the government of the unions, and so arbitrary were the restrictions put upon output that a bricklayer, for example, was not allowed to lay more than 400 of the commonest brick for a day's labor, while 1500 would be a fair average day's work of eight hours. But the engineers' strike, which lasted about seven months and affected practically all the machine shops of England, was the "straw that broke the camel's back" and proved the beginning of a new era—or at least a partial return to first principles—and organized labor then and there began to lose its grip, to the advantage of England's industrial and commercial institutions, which up to that time had gradually been going backward, until conditions became so intolerable and the outlook so serious as to cause great alarm and anxiety, and to lead to the adoption of drastic measures through which to bring about a change.

The Open Shop in England.

The employers, recognizing self preservation as the first law of nature, began to organize more solidly and upon a more substantial and businesslike basis, and are now far in advance of this country in the matter of organization, and were it not for the fact that they permitted the unions to gain such complete control as they did, before coming to a realization of what was bound to follow, they would to-day be absolute masters of the situation. But as it is, they have the situation well in hand, and union and nonunion men, in about equal numbers, work side by side without friction in trades that are organized, it having been declared illegal to strike against the employment of nonunion men or to demand the discharge of a man because he does not belong to a labor organization. Thus the question of open or closed shop has been settled in England. It is claimed that some large employers of labor in England even now favor trade unions, on the ground that they would rather deal with the men collectively than as individuals, and that they have less trouble now that unionism has gotten down to a more conservative basis and the unions do not act so badly as they did.

The Taff Vale Decision.

The next great blow to unionism in England was the Taff Vale Railway decision, which cost the Amalgamated Society of Railway Servants \$243,000 in damages and costs for injury inflicted upon the railway company through conspiracy to compel them to submit to the demands of the union, and in connection with which case the Attorney-General, Sir Robert Finlay, said:

"What the House of Lords decided was that the ordinary law of the land be applied to trade unions as to everybody else. They did not introduce any exceptional law for the case of trade unions; they decided that

where those who constituted trade unions employ officials, for the acts of those officials within the scope of their authority, within the scope of their duty, they are liable, just as any other employer is liable for the acts of his servants." That is the whole decision in the Taff Vale case.

On the whole, I think it may be truthfully said that labor conditions in England have greatly improved since the great engineers' strike to which I have referred; but the improvement has been brought about first through thorough organization of the employers, and, second, through the decision in the Taff Vale case.

Desperate Conditions in New Zealand.

For the ultimate results of the complete reign of trade unionism let us turn our eyes to Australia and New Zealand. Until recently New Zealand has been referred to by theorists and labor leaders as the land of no strikes, the land of bliss, the Elysium of labor's dreams, &c., and to read some of the beautiful word pictures that have been drawn of that land of government arbitration and labor courts one might become impressed with the idea that New Zealand is the one spot on earth which is blest with a perfectly happy and contented people, and that its blessed condition is attributable to the fact that organized labor and socialism, working hand in hand, reign supreme and control all branches of legislation, industry and commerce. Our attention is of late frequently called to accounts of the deplorable conditions in New Zealand and to the enormous and constantly increasing debt of that country, which is already burdened with the greatest per capita debt of any country in the world. Already the furniture manufacturers of New Zealand have been compelled to cease manufacturing that product owing to a decision of the Court of Arbitration fixing wages at a rate which made the manufacture of furniture in competition with foreign manufacturers prohibitive, and the manufacturers decided to stop manufacturing and import the product of foreign manufacturers.

The Australian *Globe* has published distressing accounts of conditions in Australia and gives statistics showing that citizens of all trades and occupations are leaving the country. It states that in ten years, in Victoria, where the labor legislation has been carried furthest, the loss in population has been 112,000; that the number of departures from New South Wales and Victoria has reached alarming proportions, and that in six months over 16,000 persons, comprising tradesmen, master craftsmen, sheep growers and farmers, have flown from the tyranny of the unions. And thus the Elysium of labor's dreams has vanished.

Conditions Here.

Now, suppose we leave the socialistic labor legislation of Australia and New Zealand for those countries to look after and turn our attention to what is going on in our own midst, and what do we find? We find organized societies, called labor unions or organized labor, which, during a half century of existence, has succeeded in enrolling in its membership about 10 per cent. of the wage earners of the country, 60 to 75 per cent. of whom are there against their own free wills. We find that not only in the ranks, but among many of the officers of this so-called organized labor, the shining lights and leading spirits are of a class which openly defies our laws, and which knows but little and cares less about the rights of those who do not agree with them; we find an organization made up and conducted along the lines of graft, lawlessness and crime; we find an organization having "slugging committees," sometimes called "educational committees," "wrecking crews" and other interior secret adjuncts, to which are intrusted the duties of destroying business, the maiming and killing of those of the toiling masses who decline to accept their ultimatum and join their rule or ruin order; we find an organization all the members of which are not in sympathy with anarchy, but of whom all anarchists are in sympathy, and we find an organization which, if not suppressed, will sooner or later, if not by peaceful means, then by mob rule and lawlessness, override the natural and constitutional rights of the citizen, and overthrow the institutions upon which our Government is founded; and we ask, "How should organized labor be dealt with?"

* An address before the Philadelphia convention of the National Metal Trades Association.

Some say nurse it, temporize with it and arbitrate questions with which, in many cases, arbitration should have no concern. The logical answer to this proposition is that organized labor has grown fat on that very policy and would be quite willing that it should be adopted generally, for then it would, bit by bit, get all it demands in much less time and much easier than it can otherwise ever expect to reach its goal.

Others say enact laws to control it, but this is absurd, because we already have laws to control it, but they don't control. Moreover, organized labor assumes to be above the law. Others say enforce the law and make organized labor behave itself. That is perfectly logical, so far as it goes, but how are we going to enforce the law with the politician toadying to that mythical labor vote which he sees through spectacles which the artful labor leader puts on his nose to look through, and when public sentiment offers, as it has been wont to do, only passive resistance to the breaking of the law in cases of labor strikes?

Others say have no dealings with organized labor as such; don't recognize it in your business; let organized labor attend to its business and you to yours. Now, that is all very well in theory and sometimes works very well in practice. I know of cases where it has been fully successful, and so do all of you. But single handed and alone, it is not always practicable. Much depends upon circumstances; and long continued enjoyment of such blessed independence depends almost entirely upon the growth and strength of the other fellow. If he is permitted to go on uninterrupted in his mad career, you will soon find yourself surrounded with such disagreeable environments, and you will find the atmosphere so full of the germs of unionism, that no person will have the courage to work for you, if indeed the "boss" would permit any person to do so, and you will wish that you had never been born.

Organized Labor a Humbug.

Organized labor has made its record, the people know what it is, and nothing that I can say will change it, although I may have said, or may yet be able to say, something which will help to awaken the people to action against it. I believe the people, and when I say "the people" I mean the masses, already realize that so-called organized labor of to-day, so far as ameliorating the condition of the tolling masses is concerned, is a humbug from start to finish; that it stands first, last and all the time for power and graft, and that it is an institution through which unprincipled men seek to live without honest work. It may be claimed that there are some exceptions, but I am not claiming that. There is no good reason that I can conceive of why the responsibility for the crime and lawlessness with which, in the name of organized labor, this country is pestered, and the cruelties and injustice that are heaped upon nonunion workingmen, should not be placed upon those who are at the head of the institution, and whose business it should be to either control their constituency or get out and make room for some one who can and will and who would not head such an institution of crime and disorder unless they sanctioned it.

Shall we forfeit our rights to dictate the manner in which our capital shall be managed and the product of our brains utilized? Shall we permit ourselves to be coerced and intimidated into recognizing and bargaining with an organization whose record is one of conspiracy and crime, and thereby become co-conspirators? which is exactly the position we occupy when we enter into an agreement with the union to discharge men who are not members of the union, or to force men into the union, or to refuse boys an opportunity to learn a trade, which otherwise we would give them.

Shall we take a part in this movement against the natural law of economics and which absurdly proposes to abolish the law of supply and demand, and which is working such terrible hardship on all who cannot and do not participate in the higher wages to the few, enforced by methods which are in direct violation of those laws and of all our conspiracy and criminal laws? This is exactly the position in which we place ourselves when we recognize the union and become a party to any agreement with the union which in any manner abridges our freedom of contract. We may twist the proposition as we will, we cannot escape the fact that we are aiding

and abetting a conspiracy against the constitutional rights of the citizen to "life, liberty and the pursuit of happiness," or that we are guiltless before the law against conspiracy.

Shall we recognize, by contracting with it, an institution which seeks to divide the people into classes and to form a circle within which the wage earner must be content, and which seeks to place a premium upon indolence and a limitation upon production, the source of all wealth?

If our answer to these questions is negative, then the answer to the main question, "In the light of present developments, how should organized labor be dealt with?" is,

Refuse to Recognize It

in your business. But you say, "That is easier said than done," and I say, so it is; nevertheless, in very many cases, even single handed and alone, it is not so difficult as we have imagined it to be, and right here is where the significance of that insignificant word "if" comes in.

If employers of labor will organize and organize for business and organize to stay organized; if they will make up their minds that thorough organization against the evils of the present type of unionism is the only perfect solution of the problem; if they will do their full duty in encouraging the people at large in organizing against those evils; if they will throw aside all selfishness and contribute of their money as freely as they lick revenue stamps when the Government has an emergency on hand and needs money; if they will protect and defend to the last, as they should do, the nonunion wage earner in his natural and constitutional right of contract; if they will do their full duty, as true American citizens, in the interest of enforcement of law and order, they will not live in fear of the brickbat and the billy, and they will find the agitator and breeder of discontent will soon become a thing of the past.

Developments of the past year on lines of organization, not only of employers but of working people and citizens generally, against the methods of unionism as it has been conducted, and the great public sentiment which has been awakened, as well as the changed attitude of the public press, are encouraging signs that the end of union terrorism and domination is near at hand. But there is great work yet to be done, particularly in

The Matter of Education.

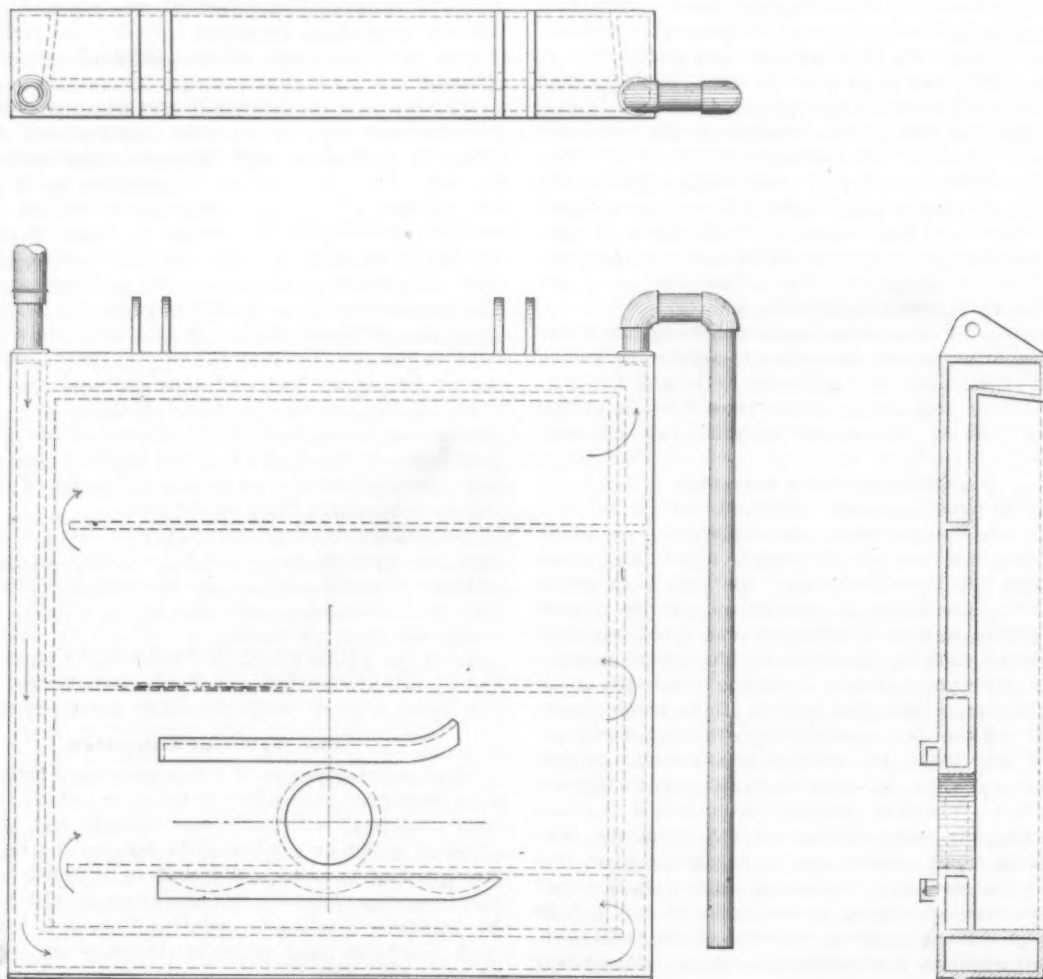
The working people of this country are being deluged with literature, disseminated by labor unions and socialistic societies, which teaches hatred and discontent, much of which is calculated to inflame the reader with the spirit of anarchy. We need to establish and maintain a system whereby the same people will be reached by literature tending to counteract the evil influence of such teachings, and whereby, through our educational bureau, they will become educated to a better understanding of the law of economics and spurn the idea that they can lift themselves by pulling on their bootstraps, which is, in substance, what the fallacy of enforced raising of wages amounts to when carried to its logical or illogical conclusion. This work is, I understand, to be undertaken by the Citizens' Industrial Association of America. It will require a great deal of money to prosecute, and it is hoped and believed that there is in this country patriotism enough to produce it.

As the situation presents itself to-day, there are some very bright clouds on the horizon, and we have only to turn our eyes to Chicago to see what organization can do toward enforcement of law, the bone and sinew of the whole proposition. Give us absolute enforcement of and obedience to law and the question of whether shops shall be "open" or "closed" will settle itself, because to attempt to enforce a "closed" shop is conspiracy, and when thoroughly tested will, I believe, be so interpreted, and has been so interpreted in England. We can then feel free to recognize unions or not, as we see fit, without fear of the bludgeon if we do not. Nevertheless, in the light of the record which organized labor has made for itself, we should refuse it the encouragement and support which recognition in the management of our business would give it.

The Knox Water Cooled Furnace Door.

Where furnace doors are subjected to very high heat it is practically impossible to protect them sufficiently with fire brick to preserve the iron construction from burning and cracking. The new form of water jacketed door, shown herewith, is for use under just such unfavorable circumstances, and was designed with a view of securing a prolonged life for the door without making its construction a complicated one. In the illustrations the door is shown in elevation and in section, vertically and horizontally. It is a hollow casting, preferably of bronze, with a recess on the side toward the fire, which is filled with fire brick in the usual manner. The sides, top and bottom are known as cheeks and sills, respectively, and

Another form of door for use where the extra protection of fire brick is not needed has the appearance which the one shown would have were the sills and cheeks removed. Its interior is designed on the same principle, with baffling partitions to cause the water to follow a tortuous path. In any of the forms where an eye or peephole is required it is cored in the casting near the center of one of the compartments, and guides are cast or bolted on the outer face to support the slide or leaf for closing the opening. To insure efficient circulation of the water, pockets are avoided where steam might accumulate and the partitions are inclined upwardly in the direction of flow, so that the steam will slip under them and pass on in its course. Another advantage is gained by having the upper sill closed and the inlet and



THE KNOX WATER COOLED FURNACE DOOR.

are hollow like the main body. In one of the forms in which the door will be made the lower sill is a separate casting and is bolted to the main body, so that this part, being the quickest to give out, may be renewed at but a small fraction of the expense of replacing the entire door. In the form which is illustrated the door is suspended from lugs at the top, but it may be quite as readily mounted to swing on a vertical axis where preferred.

The main body, including the sills, is divided into horizontal compartments, as shown, each of which communicates with the adjacent compartments at the opposite ends, so as to form one continuous passage back and forth through the door from bottom to top. The inlet for the cooling water is at the left end of the lower sill and the outlet at the right end of the upper sill, the connections with the source and waste being made with rubber hose, or metallic pipe with flexible joints, to allow for the opening and closing of the door. Where the door has a separate lower sill communication between its chamber and the next above is made by a U-connection; otherwise, the opening is made through one cheek, in the same way as for the other compartments.

outlet pipes of small capacity compared with the cavities in the door. The water may then be under a pressure of, say, 15 to 20 pounds, which will increase the speed of the current and make the circulation positive. It has been found in practice that under these conditions the life of the door is materially lengthened. By having the circulation under pressure it is also possible to use the same water successively in the cooling of several doors.

Luther L. Knox of Pittsburgh, Pa., is the inventor of the door described, and it is manufactured exclusively by the Keystone Bronze Company of the same city. Doors of this pattern are now being used by the Clairton Steel Company, Clairton, Pa.

The Exhibition Commission at Ottawa, which has charge of the Dominion exhibits to be sent to the St. Louis Exposition, has received from the Londonderry iron mines of Colchester County, Nova Scotia, an exhibit of iron ore of the weight of nine tons, embracing the varieties of commercial ore found in that district. It includes specimens of hematite, siderite, ankerite, and specular iron ore and iron ochre or paint ore.

Prices of Soft Coal and Labor.

Many consumers and others are inclined to view with alarm the increased price of soft coal. We doubt very much if they credit the statements which may have been presented to them by sellers that this increase in recent years has been largely the penalty paid to organized labor. One need only take the boastful statements of the leaders of the miners' organization which have recently appeared to know that this is a fact. What business man is there who can point to the growth of his affairs, to say naught of his profits, at such a rate as is presented in the following statement:

In 1896, before the day of joint conferences, the rate for pick mining was 45 cents a ton; in 1897 it was put up to 51 cents. At the first joint conference, which was held in 1898, an advance in the mining rate was granted, and the following base rates were established: Pennsylvania and Ohio, 66 cents per ton for lump coal; Indiana, bituminous, 66 cents per ton for lump coal; Indiana, bituminous, 40 cents per ton for mine run; Indiana, block, 76 cents per ton, lump coal; Illinois, Danville as basis point, 40 cents per ton, mine run. In 1899 the agreement of 1898 was reaffirmed.

In 1900 an advance of 14 cents for lump and 9 cents for mine run made the scale as follows: Pennsylvania and Ohio, and the block district of Indiana, lump, 80 cents per ton; Indiana, bituminous, mine run, 49 cents per ton; Indiana, bituminous, lump, 80 cents per ton; Illinois, Danville as basis point, 49 cents per ton.

In 1901 and in 1902 the agreement of 1900 was reaffirmed. In 1903 an advance of 10 cents for lump and 6 cents for mine run made the scale as follows: Pennsylvania, Ohio and the block district of Indiana, lump coal, 90 cents per ton; Indiana, bituminous, mine run, 55 cents per ton; Indiana, bituminous, lump, 90 cents per ton; Illinois, bituminous, mine run, Danville as a basic point, 55 cents per ton.

Now this year came the offer of a reduction from the operators; that the interstate agreement of the present year be continued with the same conditions for two years from April 1, 1904, until March 31, 1906, with the following exceptions, to wit: First, That the price for mining be reduced 5 cents per ton on 1¼ inch screened lump coal, pick mining, in the Western Pennsylvania thin vein, the Hocking, the basing district of Ohio, and both block and bituminous districts of Indiana; 3 cents per ton on mine run coal, pick mining, in the bituminous district of Indiana and at Danville, the basing point of Illinois.

Second, That the price for machine mining be reduced 4 cents per ton on screened lump coal in Western Pennsylvania, thin vein, and the Hocking, the basing district of Ohio; 5 cents per ton on screened lump coal in the block and bituminous districts of Indiana, and 3 cents per ton on mine run coal in the bituminous district of Indiana, and at Danville, the basing point of Illinois.

By a referendum vote the men have agreed to this proposition, and it is peculiar to note the constituent parts of that vote. The part forming the district operating under the interstate agreement voted thus:

	For.	Against.
Ohio	7,036	26,609
Illinois	34,700	14,702
Indiana	4,784	10,086
Pennsylvania	6,993	14,530
Totals	53,513	65,927

Outside districts, such as Central Pennsylvania, Iowa, Maryland, West Virginia, Kentucky, Michigan, gave a vote of 15,013 for and 36,000 against. It is noticeable that Illinois, the hotbed of unionism, gave a terrific vote in favor of a strike; that meant plenty of local troubles there this summer.

The new scale gives this result:

Class Work.

Pick mining:	
Pennsylvania, Ohio and Indiana—Screened lump, per ton	\$0.85
Illinois district—Mine run, Danville basing rate, per ton .....	.52
Machine mining:	
Pittsburgh district—Lump, thin vein, per ton .....	.57
Mine run, thin vein, per ton .....	.3543

Lump, thick vein, per ton .....	.4820
Mine run, thick vein, per ton .....	.2974
Indiana bituminous district—Punching machine, lump, per ton .....	.67
Punching machine, mine run, per ton .....	.42
Chain machine, pump, per ton .....	.635
Chain machine, mine run, per ton .....	.395
Hocking Valley district—Jeffrey machine, lump, per ton .....	.57
Jeffrey machine, mine run, per ton .....	.3955
Chain machine, lump, per ton .....	.615
Chain machine, mine run, per ton .....	.3992
Illinois district—Mine run, Danville basis, per ton .....	.42
Track layers, per eight-hour day	2.42
Track layers' helpers, per eight-hour day	2.23
Trappers, per eight-hour day	1.065
Bottom cakers, per eight-hour day	2.42
Drivers, per eight-hour day	2.42
Trip riders, per eight-hour day	2.42
Water haulers and machine haulers, per eight-hour day	2.42
Timbermen, per eight-hour day	2.42
Pipemen for compressed air plants, per eight-hour day ..	2.42
Company men in long wall mines of third vein district, Northern Illinois	2.23
All other inside day labor, per eight-hour day	2.23

Vice-President Lewis of the United Mine Workers illustrates by the following table what the interstate movement has done for the miners in the way of wages, taking the Pittsburgh district as a basing point:

	1896.	1900.	1904.
Pick mining, per ton .....	.45 cents.	80 cents.	85 cents.
Hours per day	9 and 9½	8	8
Drivers, per day	\$1.40	\$2.10	\$2.42
Inside day men, per day	\$1.40	\$2.10	\$2.23

Does not this statement offer a refutation to the oft repeated statements that the operators are growing rich at the expense of the consumer?

The carriers of soft coal have agreed to hold to rates made a year ago; great pressure was brought to bear by the operators to get a reduction, but none was forthcoming. For over a month the operators have been warding off the final settlement. The uncertainty of a wage settlement by the miners and operators was responsible for several postponements, but the railroads, so it is understood, were anxious to forecast the outcome of the wage conference and fix their rates. The operators in the meantime were strengthening their position and receiving the support of the large consumers.

The Pennsylvania, Baltimore & Ohio, Reading, Norfolk & Western, Chesapeake & Ohio, New York Central and other leading railroad companies have announced their through rates on soft coal freights for the coming year. They are unchanged from last year. The demand of the Pittsburgh operators was that the rate on cargo coal be reduced to 73 cents per ton to Lake Erie ports, and that fuel coal be reduced to 83 cents a ton. The present rate on cargo coal from the Pittsburgh district to Lake Erie ports is 83 cents a ton; from the West Virginia district, 91 cents, and from the Ohio district, 80 cents. The rate to Chicago for all rail shipments is \$1.90, this being an increase of almost 25 per cent. over the rate prevailing in 1902.

The Pennsylvania Tunnel Contracts.

In awarding the contracts for construction work on their New York tunnel last week the Pennsylvania Railroad only provided for the two river sections. The contract which the O'Rourke Engineering Construction Company received provided only for constructing the two tubes under the Hudson River and extending from shore to shore. The contract for the four tubes of the East River section, which S. Pearson & Sons, Limited, of London, England, received, also included only the work from shore to shore.

This leaves a considerable portion of the work still to be contracted for, including the entire section underneath Manhattan Island and connecting the two river sections, as well as the land sections at the New Jersey and Long Island terminals. It is expected that these contracts will be awarded shortly.

No contracts for iron or equipment have been placed by the two contracting firms as yet.

The O'Rourke Company will require about 52,000 tons of finished castings for their work, and the Pearson firm will require 120,000 tons.

As the tunnel on the New Jersey shore will be more

than a mile long, and as the work on Manhattan Island is to be very considerable, it is estimated that almost as much iron will be required for these land sections as the two contractors for the river sections will require combined.

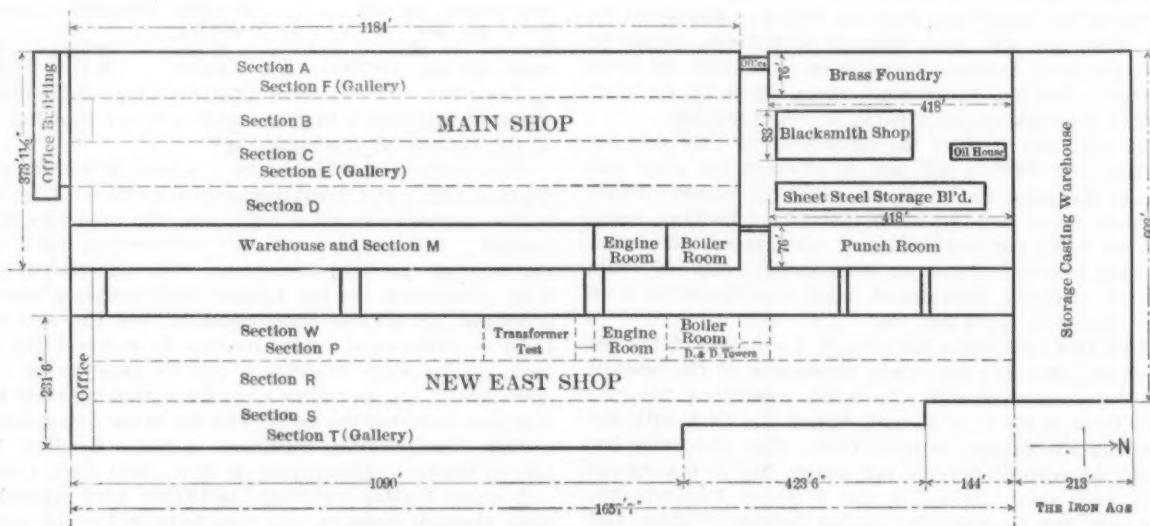
The New East Shop of the Westinghouse Electric & Mfg. Company.*

The following outlines the plan for utilizing the floor space of the new east shop of the Westinghouse Electric & Mfg. Company at East Pittsburgh, said to be the largest single building ever erected for manufacturing purposes. The total length of the building is 1658 feet. It has a width of 230 feet for a length of 1082 feet from the south wall; a width of 190 feet for a length of 423 feet, and a width of 150 feet for the remaining 144 feet of length—the reduction in width affecting the east aisle only. The east end wall of the casting storehouse is joined to the east shop, making a continuous east wall, having a total length of 1868 feet, or more than 1-3 mile. In general the design of this building closely follows that of the original main machine shop, there being a central

ing division. Following the practice in the main shop, the five aisles of the east shop will be known as sections, each having been assigned a characteristic letter in this order: West aisle, ground floor, section P; center aisle, section R; east aisle, ground floor, section S; east aisle, gallery floor, section T; west aisle, gallery floor, section W.

When the east shop is in operation it will provide large extensions to many of the existing departments in the main shop. In the allotment of space in the east shop much attention was given to caring for these extensions and so to locate departments that the transportation of materials would be reduced to minimum distances. The cost of manufacturing operations was the paramount issue; the cost of transportation being next in importance because of the long distances between departments due to the size and grouping of the buildings.

South of the power house division wall, section P will be utilized for the manufacture and test of oil insulated and air cooled transformers and static interrupters, and, until the space is needed for manufacturing purposes, this apparatus will be prepared for shipment, boxed and stored within the section, the actual loading on cars being also provided for at the south end of the section.



Complete Works at East Pittsburgh, Pa.

THE NEW EAST SHOP OF THE WESTINGHOUSE ELECTRIC & MFG. COMPANY.

high bay and two side aisles having ground and gallery floors. The central bay is 70 feet wide, and is unobstructed for its entire length of 1658 feet, except for a drawbridge 33 feet wide, approximately in line with the present drawbridge in section D. The ground and gallery floors of the east side aisle are 80 feet wide for 1082 feet, and are 40 feet wide for 432 feet—both unobstructed by partitions. The ground and gallery floors of the west side aisles are 80 feet wide for the entire length of 1658 feet, and are obstructed by the partition walls inclosing the power house, to which reference will be made later. The east shop is connected with the older buildings by seven bridges, all of which are on a level with the gallery floor, or higher, thereby permitting the passage of interworks and freight trains without interference.

The main entrances to the east shop are at the south end in the center of the building, on the ground and gallery floor levels. For a distance of 48 feet each side of the entrances, and upon both floors of the south bridge, are located a number of offices, which have been allotted to various departments, as follows: Ground floor, east, publishing department; ground floor, west, specification department; first or mezzanine floor, east, detail engineering department, office division; first floor, west, purchasing department; second or gallery floor, east, superintendent's office; second floor, west, production department; third floor, center, engineer of works' office; south bridge, both floors, detail engineering department, draft-

The transformer testing department is to be located in the space south of the power house for the entire width of the section by 192 feet long and inclosed by brick fire walls with arched ceiling, making the department as nearly fire proof as possible. Within the walls inclosing the transformer testing department a space 64 x 80 feet has been allotted to the electrical engineering department for experimental determinations. This space is separated from the transformer testing department by a brick wall 8 feet high, over which electric traveling cranes can pass to make the necessary lifts of apparatus. A small room has been provided in this space, having partition walls extending from the floor to the ceiling, in which experimental tests may be made upon detail apparatus designed for operation upon very high tension lines.

The power house is located in section P, and the north and south brick partition walls extend up to the roof through section W. The east side wall extends from the ground to the roof, separating the power house from section R; the whole space so inclosed being approximately 312 x 80 feet. The engine and generator room occupies 128 x 80 feet, and the boiler room and stack room 184 x 48 feet. The two rooms are separated by a brick partition wall extending from the basement up to the roof, and there is another full high brick wall on the east side of the boiler and stack rooms, there being no gallery floor over the boilers. That portion of the roof over the main inclosure of the power house is made of concrete and the gallery floor within the power house is

* Abstract of an article by C. C. Tyler, superintendent of the plant, in the February issue of the Electric Club Journal.

supported by heavy steel girders and brick arches. Between the east wall of the boiler and stack rooms and the east wall of the power house, separating it from section R, in an area approximately 184 x 32 feet, provision has been made for the erection of 12 towers for the treatment of insulating materials by a continuous process, these towers being a part of the extension of the dipping and drying department.

The space north of the power house, section P, will contain the tinnery, pole piece and cutting off departments. The first will manufacture transformer tanks, field coil cases and other sheet metal work, as heretofore, and is located here on account of its proximity to the transformer department. For the same reason the pole piece department was located here to be near the punch department, from which it receives most of its material. The deliveries of finished pole pieces from this department will be made to sections A, B, C, D, R and S, and to the store keeping and shipping department. The cutting off department is an entirely new department, in which it is proposed to cut cold rolled steel, axle steel and tool steel for all departments of the works requiring material of this character cut to definite lengths. The stock of material required by the cutting off department will be carried in the casting storehouse extension, to which reference will be made later. The removal of the tinnery and pole piece departments from their old to this new location will provide ample space for the extension of the punch, annealing and sheet steel painting departments of section G. The cutting off department and the storage of the materials required by it in the casting storehouse will make available space in the blacksmith shop, section H, for additional forging fires.

Section R will be utilized for the manufacture, test and shipment of all classes of generators and motors, rotary converters, and apparatus having rotor and stator elements, excepting street railway motors, from 100 horsepower up to machines having a maximum internal bore not exceeding 6 feet. This section will later relieve sections B and D of the smaller apparatus they now manufacture, and for which their equipment of machine tools is not so well adapted as that to be located in section R. By limiting the size of apparatus to be manufactured in this section to a definite diameter of maximum bore of the stationary parts, the maximum sizes for the machine tool equipment were immediately determined. The largest planers will take 10 feet between uprights, the largest boring mills will swing 10 feet between housings, and the largest lathes will swing 6 feet. The new machine tools for this section, which have been purchased, were selected with due regard for the use of high speed cutting tool steels, and are all of very heavy pattern to meet the unusual requirements. The special equipment of machine tools for the manufacture of turbo-generators will probably be located in this section.

Section S will differ from any other ground floor section in that but little of its product will be completely assembled within the limits of the section. It will, in the main, supply sections A, B and C with parts ready for assembling, and its space will be apportioned among six new departments—namely, frame, bracket, spider, building, shaft and bearing departments. The frame department will perform all machining operations on frames used in the manufacture of all apparatus now made in section C, and its product will in most cases be ready for assembling operations when it leaves the department. The bracket department will perform all machining operations upon all brackets used in connection with the product of the frame department. The spider department will perform all machine operations upon all spiders used in the manufacture of all apparatus now made in sections A and C, and its product will be delivered to the building department. The building department will build sheet steel upon all shafts and spiders for the rotors required for the apparatus manufactured in sections A and C, and within all frames as required by section C, and also file the slots, preparatory to winding, in the sheet steel which it has built upon rotors and stators. The shaft department will perform all machining and finishing operations upon all shafts required by sections A, B, C, D and R which are less than

8 inches diameter by 8 feet long, and provision has been made for finishing the parts of shafts having circular cross section by suitable grinding machines. All shafts within the maximum size given will be made by this department to meet the requirements of the storekeeping and shipping department and of the detail and supply department. The bearing department will perform all machining and finishing operations upon all bearings required by sections A, B, C, D and R which have a bearing surface less than 8 inches in diameter. It will also supply the storekeeping and shipping department and the detail and supply department with the bearings required by them to fill their orders. The establishment and operation of the departments of section S will change the character of the work now carried on in section C, which will eventually comprise four departments—namely, detail, assembling, winding and testing departments. The detail department will make the smaller parts required in the manufacture of generators and motors under 100 horse-power now made in section C, such as covers, resistance rings, auto-starters for type H motors, &c. The other departments will carry on similar operations to those now being performed, only on a larger scale, and the vehicle motor department, section F, will be absorbed into the departments of sections C and F.

Section T will be utilized exclusively for the manufacture of detail apparatus. The various departments now in section M will be transferred to this section, with the exception of the screw and instrument departments. The names of the various departments in section T so far determined are: Rheostat, switch, milling, oil switch, circuit breaker, marble working, switchboard and detail testing departments. The removal of these departments from section M will make that space available for an extension to the storekeeping and shipping department, provide room for the separate storerooms for the detail and supply department, and also permit the transfer of the polishing and plating department from section O into section M at the north end, next to the power house.

The space in section W south of the power house has been allotted to the instrument, experimental, model and small tool departments. The first will be located next to the offices of the production department, and will manufacture the several classes of instruments not made at the Newark works. Provision will probably be made in this department to test and prepare for shipment all the instruments of its own production. The experimental department will be moved to section W, from its present location in section F, and its operations will be limited to experimental work only. The model department will be used to develop the smaller types of apparatus which have passed the experimental stage and to produce manufacturing models which can be used to prepare special tools, fixtures and gauges for the economical manufacture of their constituent parts. The small tool department will be transferred from section F to that portion of section W immediately south of the power house. It will comprise the tool supply and tool repair departments, and will control, as heretofore, all the sub-tool rooms located in other departments. In that portion of section W inclosed by the power house main partition walls will be located the japanning department and the extension to the dipping and drying department, including the new vacuum impregnating and drying tanks. Section W, north of the power house, already contains the tool and die department, in which are made all the special tools, jigs, dies, fixtures, formers, &c., required by the various departments of the East Pittsburgh works. This department will also repair the dies used by section C, and repair many of the machine tools which become worn in other departments. The removal of the small tool, tool, experimental and vehicle motor departments from section F will provide for large extensions to the brush holder, commutator and screw departments, and permit the establishment of a controller department, it being the plan to utilize section F for these four departments only.

Between sections P and W and sections S and T mezzanine floors have been erected, upon which will be located the coat and toilet rooms for employees of the east shop. Immediately north of the east shop and connected

with it is the casting storehouse extension, which is approximately 210 x 600 feet, and is divided throughout its length into three bays each 70 feet wide. It is at right angles to the length of the main and east shops, and will contain the returned material department and scrap department for the various scrap materials, except brass and copper alloys. The major portion of its area will be utilized for the storage of castings and steel bars of the different qualities required in manufacturing operations. The storage and shipment of street railway motors will also be provided for in this building.

One of the great problems in connection with the operation of the east shop has been the method of transporting materials into and out of its different departments. Two standard gauge tracks cross sections P, R and S, and will be used for the shipment of completed apparatus from the transformer department and section R. A standard gauge track enters the north end of section B for a distance of 160 feet, which will be used for receiving the larger castings and forgings which enter into the product of this section. Plans have been prepared for a complete system of industrial railway tracks connecting all the principal buildings, the main lines passing through sections A, C, P and S and the casting storehouse, with frequent connecting cross tracks. Later the system may be extended through the gallery floors. The principal means of material transportation between sections C and S will be by a tunnel passing under both the east and main shops. The tunnel will be provided with two industrial railway tracks, and an elevator at each end will carry loaded trucks down and up. No openings into this tunnel are made except at the terminal in sections C and S. Twenty electric traveling cranes will be installed in the east shop for handling the work in departments requiring their use.

The above arrangement of departments was decided upon after careful study and now seems the best of many proposed plans. However, as departments are organized and put in operation it is not unlikely that some modification may be found advantageous.

Lake Mining Matters.

Beginning of Spring Trade.

DULUTH, MINN., March 19, 1904.—A little ore has been chartered at fixed figures for Lake Erie delivery the coming season, and at rates similar to those in force last year. But this has been only for Tonawanda, and is of small moment as regards the general market. That remains as for weeks, with some line of ore ships filled up for the season at rates to be fixed later. So many questions now enter the matter of ore freights that it is impossible to make an agreement at this time. The wage and management question are unsettled and are fighting ground. The probable tonnage to be moved is fairly well understood in some circles, and it is sure that nothing can be done until well along in May, on account of ice, which shows no signs of breaking or melting.

Mines are gradually resuming, and a number in addition to those already referred to will start shortly. The situation is far more clear than 30 days ago, and the feeling is better than in months. There is no increase of inquiry for ore lands and developed properties, and none is expected for many months.

The first shipment of ore from the Baraboo district was made March 13 by the International Harvester Company to their Chicago furnaces. This ore was in 14 cars, decorated with flags and bunting, and bore the inscription: "First Shipment of Bessemer Ore from North Freedom, Wis." This was ore from stock accumulated last fall; the mine has not resumed and will not for a month. Shipments of about five cars a day will continue for some time.

A Better Forecast.

It is impossible to believe that many of those who are talking about excessively small lake shipments this year have put down any figures. Even should the United States Steel Corporation move not in excess of 8,000,000 tons, the production for the year can scarcely fall under 16,000,000 to 17,000,000 tons. The Steel Corporation will

not cut their shipments square in two, and can be depended upon to produce not far from 10,000,000 tons, and the total of the year will be nearer 20,000,000 than the estimates that have been given out by many ore men and shippers.

Considerable exploration will be done near Negaunee the coming summer. Lands near the new Mary Charlotte mine and in section 16 may be tested by drills, and 30 acres adjoining the new Maas mine have been taken under option, requiring drill work at once.

For several years E. F. Hatch of Norway, Mich., has been experimenting on an electric smelter of new design. Last week it was tested at Sault Ste. Marie, and the promoters claim the test was satisfactory, and that "electric smelting is a success." The test was with galena, which, say members of the company, is the "hardest mineral to refine, and therefore a severe test."

Messrs. Hulst, Olcott and Powell of the Oliver Iron Mining Company have incorporated the Hope Iron Mining Company of Duluth, with a capital of \$50,000.

The Labor Situation.

The two weeks' strike of miners at the South Range copper mines, Baltic, Champlon and Trimountain, is ended by the men accepting the last compromise offer of the companies. This offer was accompanied by a declaration on the part of President Wm. A. Paine of the Copper Range Consolidated Company that it would remain open until Saturday, and that thereafter, if the company's offer was not accepted, the mines would be closed down indefinitely. The mines were producing about 2,500,000 pounds a month, and the strike lasted more than two weeks; so that production has been cut pretty nearly 2,000,000 pounds. Labor conditions in the copper country are better than prior to this strike, and it is hardly probable that any more trouble will crop out there for some time.

In general, labor throughout the lake mining regions is in a satisfactory condition, except for one sore spot. Iron ore miners realize the difficulties that mining companies have been experiencing the past winter, and they appreciate the efforts in their behalf made by mining managements and superintendents in all parts of the district. It is one of the remarkable things connected with the disturbances of fall and winter that so little suffering has been noted in the iron ore mining fields. All through the northern peninsula of Michigan and Northeastern Minnesota there has been such a boom in the production of wood for paper making as has never been known, absorbing many men. The mining managements have carefully culled their operatives, retaining to as large extent as possible those with families, and this has had an excellent effect. Then miners have been getting high pay for some years and generally have had money laid aside. Thousands have taken the occasion to revisit their European homes during the winter, and these have been withdrawn from the competitive field. Employment agencies report that there has been no time this winter when men have not had all the work they wanted.

The one sore spot among otherwise excellent labor conditions is, strange to say, in the ranks of the most skilled and technical employees. The Dredgemen's and Steam Shovel Operators' Union last fall sent an organizer through the lake region, and most of the men on shovels along the Mesaba range joined the organization. This union now proposes to call a strike in the spring. Most of the shovelmen along the range have been helped by their employers and have worked up to their positions from lower down the ranks, and the mining companies are ready to help others to work up at any time necessary. Of course, a tie up of shovels would cut down production tremendously and shut off the mines whose product is most cheaply won.

Copper Shipments.

All rail shipments of copper from mines and smelters on the south shore of Lake Superior now average about 500,000 pounds daily, and several recent days have amounted to more than 1,000,000 pounds. The Calumet & Hecla is not shipping all its production, reserving mineral for shipment by lake to its Buffalo smelters later in the year.

D. E. W.

The Premium System in British Navy Yards.

LONDON, March 12, 1904.—An announcement of unusual importance has been made to the effect that certain of the shops in the Government dock yards are for the future to be operated on the premium system. It will, first of all, be applied to certain classes of machine work, and if satisfactory results are obtained the system will be extended. The principle upon which payment will be made is that extra remuneration can be earned for doing work in less time than the fixed time allowed for it. The scheme is as follows:

When a piece of work is given out, a certain time, based on known times taken for similar work done on ordinary time in the shop, will be allowed for it. This time allowance will include all the necessary time for obtaining tools and materials, preparing for machine and lifting and setting the work in or on the machine, any removal and resetting, change of tools and removing work after completion. If the work is satisfactorily completed in less time than the fixed time allowed for it, the workman becomes entitled to a premium varying in amount with the time saved. If, on the other hand, he takes longer than the time allowed, he will still be paid his ordinary wages. From this it will be seen that while the workman may increase his wages by his own individual effort, he cannot lose money by the introduction of the system.

The premium will be calculated as follows: The value of a "premium hour" will be considered to be one-forty-eighth of the workman's weekly wages, and the amount of premium earned on a job will bear approximately the same relation to the ordinary wages due for the time taken to complete it as the time saved bears to the time allowed.

To give an example: Suppose a man is given 48 hours to do a job and does it in 36 hours; he saves one-fourth, or 25 per cent., of the time allowed, and accordingly will be credited with 25 per cent. of the time taken to do the job, which is nine premium hours; so that a mechanic in receipt of 36 shillings per week, and whose "premium hour" rate would therefore be 9 pence, would receive 9×9 pence = 81 pence premium for this job in addition to his ordinary wages for the period worked. Similarly, a skilled laborer in receipt of 24 shillings per week, and whose "premium hour" rate would therefore be 6 pence, would, in the example quoted above, receive 9×6 pence = 54 pence premium.

A convenient way for the workman to calculate his premium is to multiply the time taken by the time saved and divide the product by the time allowed, all times being taken in hours. This will give the premium in hours, which, multiplied by the "premium hour" rate, will give the amount of premium earned.

The time taken will be recorded to the nearest quarter of an hour. In calculating the premium the time taken will include all the working hours from the time of commencement of a job up to the time of commencing the next job. Overtime and night and day shifts will be paid for at overtime rates as at present, but will only count as ordinary hours in the calculation of the "premium." Lost time, or absence without leave, will count in the time taken. Absence with leave will not be included in the time taken.

The working of the system will be as follows: Each workman on commencing a "premium" job will receive a "job ticket," on which he will find a description of the work to be taken in hand, and date and time of commencement of the job, the time allowed for it, and other particulars as to ship or service, head of charge, &c. On this ticket the shop measurer will fill in the daily time worked and particulars of overtime, leave and lost time, and when the job is finished the time of completion will be inserted on it to the nearest quarter of an hour. The ticket is then to be returned to the inspector, and if the man's next job is also to be executed on "premium," the time of commencing the new job will be the same as that of finishing the previous job.

As soon as possible after a job has been inspected and passed as satisfactory, the amount of premium earned on

it will be communicated to the workman. Premiums will be paid weekly on the Friday following the week in which they have been earned. It is to be clearly understood that a "premium" is not earned until the finished work has been inspected and passed as satisfactory.

If a man's work when finished does not pass inspection he will receive no premium for that job unless he can make good the work in the time allowed, in which case he will receive the premium on any saving of time still remaining. No premium will be paid on articles that turn out defective, on account of faulty material or other causes, during machining or other operations; but if one or more of several similar articles, for which a covering time allowance for the whole is given, should turn out defective, the workman will still receive any premium earned on the rest of the articles, the premium being calculated on the saving of time made on the reduced time allowance corresponding in proportion to the number of articles satisfactorily finished. No allowance will be made in the time taken for stoppages occasioned by breaking of straps, stopping of driving machinery, or any other cause.

In cases where a job is stopped in order to undertake more pressing work, or for any other purpose, the workman will return his "job ticket" to his inspector, and the date and time of return will be noted on it (this being the commencing time of his next job if a "premium" job). The time spent on the job up to the time of interruption will be counted as part of the time taken, and on reissuing the ticket the time allowance will, if necessary, be so revised as to give the workman as fair an opportunity of earning "premium" on the whole job as would have been possible had the work not been interrupted.

As far as practicable, time allowances for definite operations will not be reduced after they have been once satisfactorily established and regarded as standards, unless a new method of manufacture, necessitating a revision of the time allowance, be introduced. But if an established or standard time is seen to be operating unfairly to the workman, it may be increased with the sanction of the principal officer of the department. As some of the work in the department may not be deemed suitable to be done on "premium," it is to be understood that a man may be required to work on "premium" or on ordinary weekly time rate, as occasion and the work may require. Apprentices will not for the present be employed on "premium" work.

S. G. H.

Making Barb Wire in a Court Room.—A novel feature of a patent infringement suit in the Federal Court at Indianapolis by the Columbia Wire Company of Illinois against the Kokomo Wire & Nail Company, Kokomo, Ind., was the operation in court of two Bates barb wire machines, run by a 4 horse-power dynamo. The machine installed by the Illinois company weighed 1400 pounds and that of the Indiana company more than a ton. They were hoisted by cables to the third floor of the building and taken in the court room through the windows. Frequent demonstrations were given by operators of the two machines during the course of the trial, at times on steady runs for over half an hour, the making of barb wire being watched with equal interest by court, lawyers and spectators. The court has the case under advisement.

J. M. Guffey Petroleum Company and the Gulf Refining company of Pittsburgh have issued a little pamphlet, entitled *Texas Petroleum*, in which it is estimated that the production of 1903 was 14,100,000 barrels, 6,500,000 barrels of which are credited to Spindle Top, 7,000,000 barrels to Sour Lake, 500,000 barrels to Jennings and 100,000 barrels to Saratoga. Quite recently a new field has been opened up at Batson Prairie, Texas, which promises to be the largest yet discovered. The shipments from Port Arthur, Texas, by water were 7,572,849 barrels in 1903, as compared with 2,739,773 barrels in 1902, approximately one-half being loaded by the J. M. Guffey Petroleum Company and the Gulf Refining Company. The pamphlet contains two reports by Boverton Redwood of London, the well known petroleum expert.

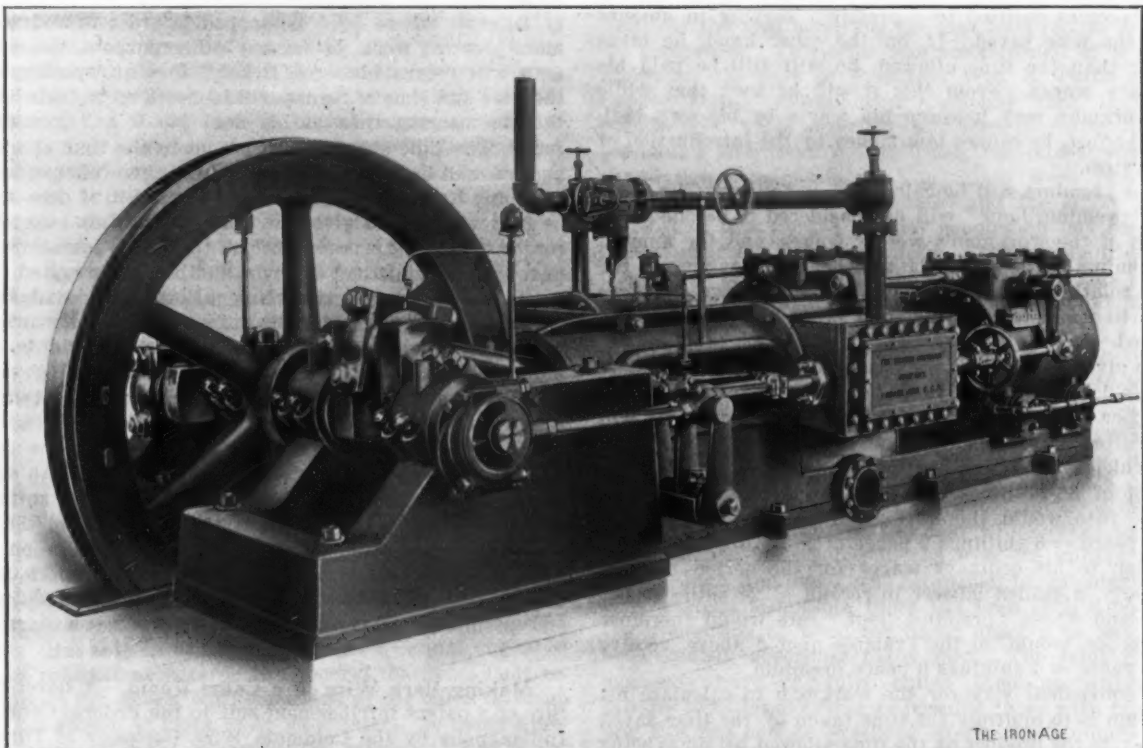
An Improvement in Valve Motion of Duplex Air Compressors.*

BY STERLING H. BUNNELL.†

The use of poppet valves held down by springs operates in pumps handling incompressible fluids merely to increase the work done by the piston, generally only by a trifling amount. The same system of valves applied to a compressor working with an elastic fluid not only involves a similar loss by the friction of the fluid in passing the spring loaded valves, but also decreases the density of the fluid filling the cylinder at each stroke, so that the total weight of gas handled falls considerably below that corresponding to the swept capacity of the cylinder. Such valves by reason of their inertia tend also to delay closing till after the reversal of the motion of the piston at the end of its stroke and thus to cause a further loss by slippage. For these reasons mechanical-

tion. The air inlet valves are usually of rotary type, driven like Corliss steam valves by a rocker or wrist plate connected to the valve arms by short links, or they may be plain slide valves. In any case, the inlet valve must close as the piston reaches the end of its stroke, and open shortly after it commences the suction stroke, the lateness of opening being for the purpose of allowing the air contained in the clearance space to expand to the pressure of the air in the intake. The required position of the eccentric operating air inlet valves is therefore approximately at right angles to the crank operating the piston, or more or less back of this position.

Air compressors of the type just described have been regularly provided with six eccentrics to operate the double steam valves and air inlet valves of the two sides of the duplex machine. A moment's consideration of the preceding paragraph will show that the cut off valve eccentric of one steam cylinder and the air inlet valve eccentric of the opposite cylinder are a little back of the position opposite the crank on the steam cylinder side,



A 13 x 18 x 18 Inch Horizontal Duplex Compressor Fitted with the Improved Valve Gear.

AN IMPROVEMENT IN VALVE MOTION OF AIR COMPRESSORS.

ly actuated inlet valves are generally applied to compressors of medium and large size. The adaptability of the duplex or two-crank type of direct connected air compressor to varying capacity requirements and occasional unusually low speed, together with the superior economy of its steam cylinders working under short cut offs, has brought about its general use except for supplying such small quantities of air as can be delivered by the single cylinder of the straight line or single crank tandem compressor of small size. It is to the common type of duplex compressor with Meyer steam cut off valve gear and mechanically actuated air inlet valves that the construction to be described applies.

The main steam valve of a Meyer or riding cut off gear is set exactly like any plain slide valve, being laid out to give proper steam lead, exhaust opening and exhaust closure or compression, without regard to the point of cut off, which will therefore come somewhere around three-quarters or seven-eighths full stroke. The riding cut off valve is operated by an eccentric set either just opposite the crank, or, better, a little back of this posi-

while the alternate steam and air cylinders have valves to be actuated by eccentrics, one set back of the position opposite the crank and the other 180 degrees from the first. It is only necessary to modify the arrangement of valve arms and links of the inlet valves of the latter compressing cylinder, using precisely similar valves, valve arms and other gear, except the rockers or wrist plates, to allow of driving the air valve gear of each side of the machine by direct connection to the cut off valve rod of the other side.

The details of the gear are clearly shown by the illustrations. Steel tube is common enough to-day to allow of using it for the right and left threaded sleeves of the cut off valves. Through each sleeve is passed a similar solid rod connected at one end by means of suitable rockers and pins to the eccentric rod, and at the other end to an arm carried on a cross shaft. This rod drives the encircling sleeve, and, therefore, the cut off valve carried on it, through the medium of two simple split clamps touching the ends of the sleeve. The cross shaft passes through bosses on the compressing cylinder casting and terminates in a boss on the opposite compressing cylinder, and carries adjacent to the latter boss the wrist plate or rocker driving the inlet valves of this side. This descrip-

* A paper read before the American Society of Mechanical Engineers, New York, December, 1903.

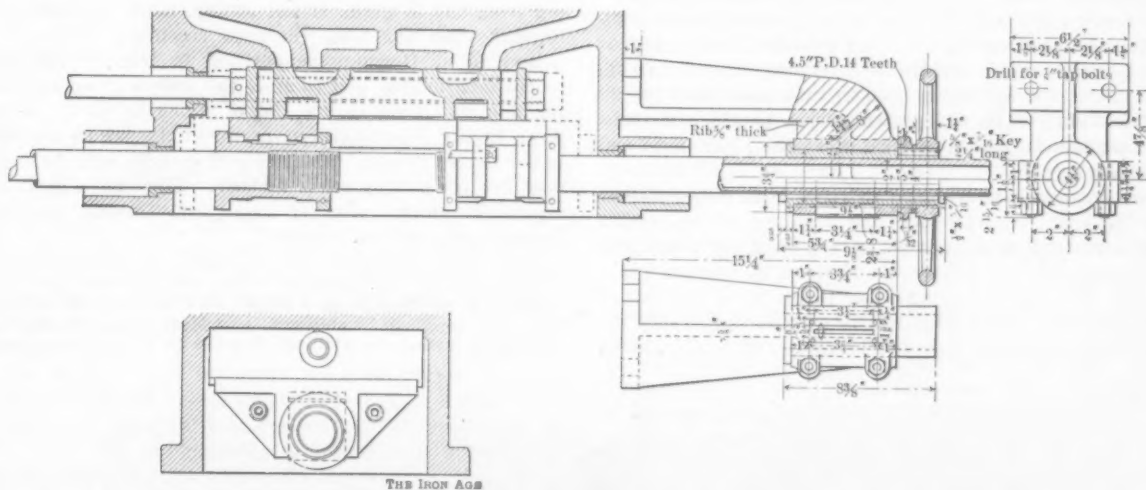
† Vice-president and manager the Brown-Cochran Company, Lorain, Ohio.

tion applies also to the details of the corresponding gear of the other two cylinders. It happens that there is absolutely no difference between the two sets of parts except in the two wrist plate rockers, and in the fact that one of the long rods is a little longer than the other, because the center of its rocker is further back on the air cylinders.

It looks at first sight as if this combination would be troublesome to lay out and to adjust in erecting the com-

pressor. The shaft is not broken and the cylinder castings remain in position the eccentric driving the air inlet valves of the cylinder which is to be operated may as well be on one end of the shaft as on the other.

The compressor shown embodies a modification of the usual framing, which has some advantages. The two separate bed plates are bolted together along their center lines, and are further bolted to a single cross member lying under the cylinders. The strains which tend to

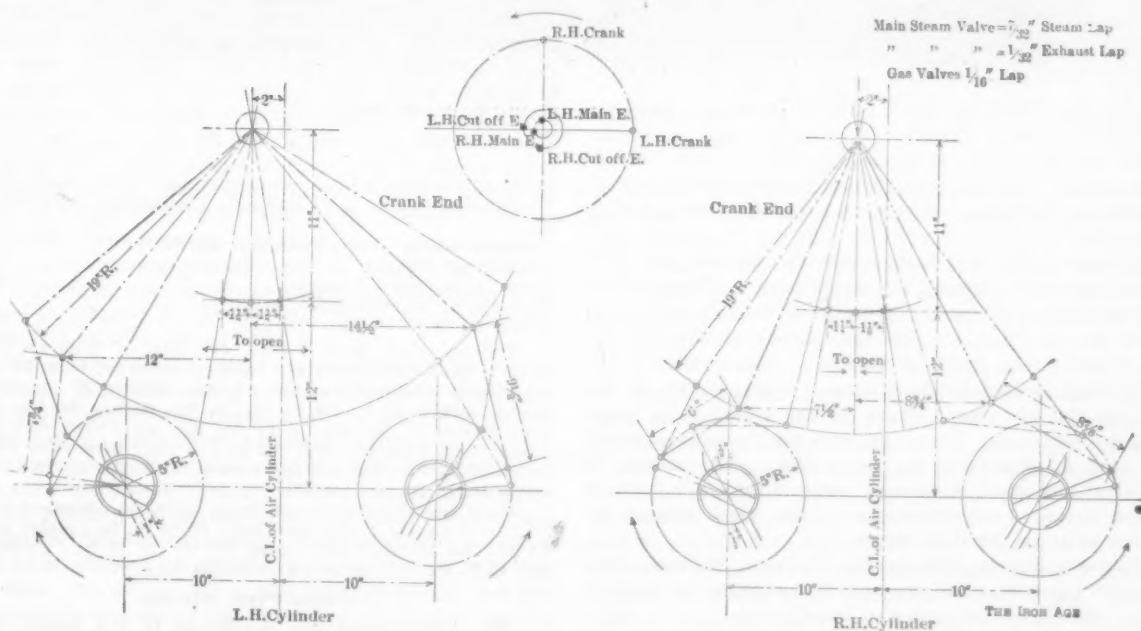


Arrangement of Steam Valves, 18-Inch Stroke Gas or Air Compressor.

pressor. There is really no additional complication, for it is only necessary to slack off the clamps on the long rods, set up the air valve motion in the usual way, locate the eccentrics as required, and then set the sleeve along the rod to give even cut offs and tighten the collars. The cut off valves can be changed to equalize the cut offs at any time without disturbing the long rod, merely shifting the clamps as desired, and the air valves may be

work the ordinary duplex machine on its foundations are thus resisted directly by the cross frame, making the machine nearly independent of a masonry foundation except as a mere support. Tie rods between the upper parts of cylinders and over the guides add greatly to the rigidity of the whole.

A number of these machines have been constructed, ranging from 12 to 24 inches stroke, all of which have



Valve Diagram for Gas Cylinders of 13 x 18 x 18 Inch Horizontal Duplex Compressor.

shifted or reset without disturbing the equality of the cut offs. The net result of the arrangement is the saving of two eccentrics, straps, rods and rockers and of the space between or outside the cylinders that would otherwise be occupied by these parts, at the cost of substituting a piece of steel tube for a solid rod and of enlarging the diameters of steam chest glands to correspond. The feature of operating one side of the machine alone in case of necessity is not lost, because so long as the crank

been shipped without taking apart and leveled upon foundations in a few minutes' time. Some of these compressors have been continuously operated at speeds up to 200 revolutions per minute for months together, and none of them have developed any objection to the combination of valve mechanism described, or have shown the tendency of the usual duplex compressor with independent frames to shift on its foundations and thus work out of alignment.

A New Grinding Machine.

The grinding machine shown in the accompanying illustration is intended for straight cylindrical and taper grinding. It was the desire in its design to eliminate all unnecessary fixtures and adjustments usually found on this type of machine, and to add a provision whereby abrupt short tapers on long shafts or rods can be ground by a former, avoiding the long overhang of the swiveled platen on the carriage, such as is necessary in the usual construction. The bed is deep and well ribbed, and ample weight and rigidity have been allowed throughout to insure accurate grinding. Instead of the usual form of carriage ways, this machine has flat ways, undercut 30 degrees, the carriage being kept in alignment by a gib on the front side. The top platen of the carriage swivels, and provision is made to adjust it at the right hand end of the carriage.

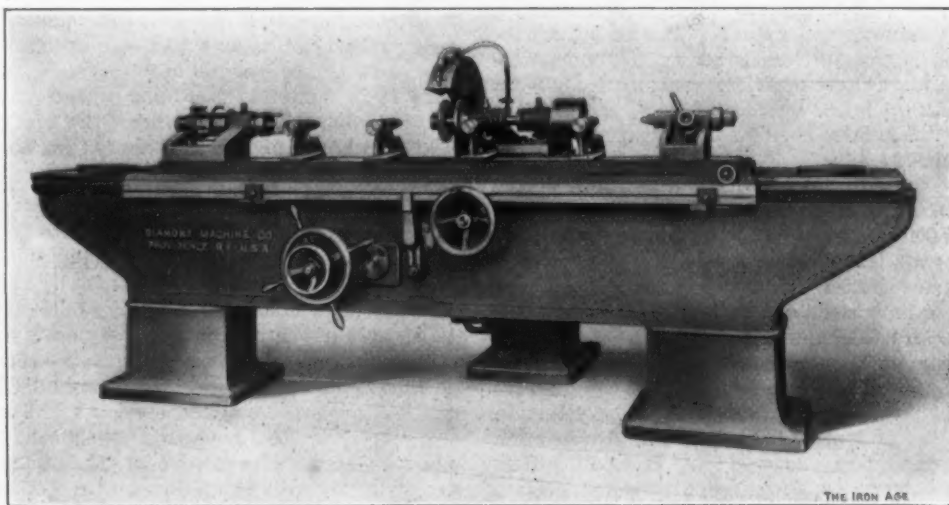
The headstock is designed to grind with either live or dead centers. The tailstock has a spring center, and a suitable number of adjustable spring back rests are provided to support slender work. Varying speeds are available for rotating the work, and three table speeds. A simple but effective mechanism is used for reversing the table. The reversing dogs on the table can be set almost

Notes from Great Britain.

The Market.

LONDON, March 12, 1904.—On the northeast coast the market has been distinctly improved by the revival of shipbuilding. It is evident that much is expected from the shipbuilding revival, for selling agents have been expressly warned by their principals to be unusually cautious in concluding contracts at present prices. If anything, some slight improvement is to be reported in pig iron, the demand, if not strong, being at least more regular than has been the case recently. There is no American or German competition in iron of any kind worth mentioning, and in steel the orders given to America and to Germany are not of much account. In the more highly manufactured products the whole tendency is for prices to sag. The luckiest makers over here just now are the rolling stock makers. They have good contracts on hand, both for home and foreign railroads. Prices to-day are as follows:

Pig Iron: Middlesbrough warrants, 42 shillings 6 pence
Forge qualities: Staffordshire cinder, 46 shillings; part mine, 47 shillings to 48 shillings 6 pence; all mine, 60 to 65 shillings; best all mine, 75 to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 44 shillings 6 pence to 46 shillings; Derby-



THE NEW DIAMOND GRINDING MACHINE.

in contact with the reversing lever, and a 60-inch carriage will run on 1¼-inch lengths, with a variation of less than 1-32 inch.

As the machine was designed for the special purpose of plain cylindrical grinding, the wheel head was constructed only with this in view. The base is heavy and spread out to absorb vibration, and contains a reservoir for water, to which the pump is attached. The saddle of the wheel head is actuated by the hand wheel shown on the front of the machine, the rim of the wheel being graduated to 0.001 inch. To compensate for the wear of wheel the head is adjustable on the saddle. The spindle is made of tool steel, hardened and ground, and runs in bronze boxes. Its bearings have been given special attention to allow for their wear.

This machine is made by the Diamond Machine Company of Providence, R. I., and is furnished in sizes to grind from 50 to 144 inches in length.

The Jacobson Machine & Mfg. Company, Warren, Pa., manufacturers of gas engines up to 300 horse-power capacity and the Jacobson stationary bottom vise, have opened an office in Room 603, Farmers' Bank Building, Pittsburgh, with E. A. Arnold in charge.

G. W. McClure, Son & Co., blast furnace engineers and contractors, of Pittsburgh, have removed their offices from the Smith Block to Rooms 705 and 706 in the new Bessemer Building.

shire, 45 shillings 6 pence to 47 shillings; North Staffordshire, 46 shillings 6 pence to 48 shillings; Lincolnshire, 49 shillings 1 penny.

Public stores stocks, Thursday, March 10:

	Tons.
Connal's, at Glasgow.....	8,653
Connal's, at Middlesbrough.....	101,511
Connal's, at Middlesbrough, hematite.....	300
Hematite, West Coast.....	15,444

Finished Iron: Marked bars, £8; Earl of Dudley's brand, £8 12s. 6d., second grade £7; common unmarked bars, £6 to £6 5s.; North Staffordshire bars, £6 10s.; angles, £6 15s. to £7; sheets: singles £6 7s. 6d. to £6 12s. 6d., doubles £6 10s. to £6 15s., trebles £7 2s. 6d. to £7 7s. 6d., galvanized corrugated sheets, f.o.b. Liverpool, £10 5s. to £10 10s.; hoop iron, £6 17s. 6d. to £7 2s. 6d.; nail rod and rivet iron, £6 12s. 6d. to £6 15s.; gas strip, £6 2s. 6d. to £6 5s.

Steel: Bessemer billets, £4 5s. to £4 7s. 6d.; Siemens billets, £4 10s. to £4 15s.; mild steel bars, £6 to £6 5s.; girder plates, £5 17s. 6d. to £6; boiler plates, £6 15s. to £7 5s.; girders, £5 15s. to £6 5s.; angles, £5 5s. to £5 12s. 6d.

Armor Plate Orders.

The long wished for movement in the armor plate mills of Sheffield, stagnant for so many months owing to the dearth of Government orders, has come at last. The total quantity of armor ordered is a little over 6000 tons, divided nearly equally between John Brown & Co., Limited; Vickers, Sons & Maxim, and Cammell, Laird & Co. As the productive capacity of each of these firms in armor plate is a maximum of 10,000 tons yearly, the present orders would not mean full employment for the maximum staff engaged on this work for a longer period than about three months, but unless there is pressure for the completion of the orders at the earliest possible moment the work will last longer than this.

The armor ordered is a portion of that required for the three new battle ships provided for in last year's naval programme and now in course of construction at the naval dockyards.

Profits and Dividends.

The Harvey United Steel Company this year pay an ordinary dividend of 15 per cent., having made a profit of £110,000, and carry £45,000 to the reserve fund. The present company were formed in 1901 to amalgamate or control four other concerns holding the rights of the Harvey patents, including the Harvey Steel Company of Great Britain and the Harvey Continental Company. It seems to have been financially an exceedingly good move.

Not so happy are the shareholders of the Barrow Hematite Steel Company, the result of whose operations for the year, after deducting £18,335 interest on debenture stock, £31,668 for depreciation, and £8408 in respect of extensions and improvements during the year, is a credit balance of £15,754. This, added to the sum brought forward from the previous year, gives a total of £18,582 at credit of profit and loss account. The directors recommend the payment of the dividends on the first and second preference shares for the year, carrying forward £1320.

On January 1 of last year the great rival tube firms of Lloyd & Lloyd of Birmingham and A. & J. Stewart & Menzies of Glasgow amalgamated. The result of the year's working is eminently satisfactory, a dividend being announced at the rate of 11 per cent. per annum for the second half of 1903, making 10 per cent. for the whole year of the greater combine of Stewarts & Lloyds. That is the same as A. & J. Stewart & Menzies had been paying for the preceding five years, but in this instance the beneficial appropriations are substantially larger. Thus the £30,000 to depreciation is double last year's amount, and the £25,000 to reserve compares with £11,000, while the £52,900 forward is £2500 more.

Unhappy are the shareholders of the Wilsons & Union Tube Company, for the balance sheet for the year shows that, after payment of interest on debentures, providing £3800 for the writing down of stock-in-trade to a safe basis, £1500 for possible loss in the realization of certain foreign accounts, and providing £9000 for depreciation for the past three years, shows a debit of £9525, which, added to the balance at December 31, 1902, increases the debit to £13,494. But for the appropriations made on the recommendation of the Shareholders' Committee there would have been a credit balance of about £4800, which has practically all been made in the last half year.

Hadfield's Steel Foundry Company, Limited, again distribute 25 per cent., after adding £15,000 to the reserve and renewal account, and carry forward a balance of £15,240. The company's business continues to expand, and to meet its requirements and to provide for several new developments the directors find it desirable to increase the capital of the company by an additional issue of 50,000 ordinary shares of £1 each.

The Bengal Iron & Steel Company pay this year 10 per cent., notwithstanding a net decrease in the profits of £10,000, due to the stoppage of one of the large furnaces for the purpose of having it relined. The chairman at the annual meeting told the shareholders that it had been discovered that there were serious deficiencies in the stocks held in India, and to meet these a sum of £10,000 had been set aside, while stringent measures had been adopted to prevent a recurrence of this dilatoriness. No actual losses had been sustained, nor had the earning powers of the concern been in any way impaired. Their other works were at present fully employed. It was proposed to erect a further large blast furnace, and when the steel works were in operation another furnace would be blown in. To meet the demands of these enlargements increased capital was required, and it was proposed to raise £50,000 by the creation of 5000 new preference shares of £10 each.

This year Vickers, Sons & Maxim, Limited, pay a dividend of 10 per cent., a decrease on previous years. For 1899 the dividend was 20 per cent., for 1900 the same, for 1901 it was 15 per cent., for 1902 the rate was 12½ per cent., but now in respect of 1903 it is only 10

per cent. The series quoted suggests a persistent diminuendo. In spite of the fact that the issue of £1,000,000 4½ per cent. second mortgage debentures a year ago means an addition of £45,000 per annum to the fixed charge, the directors might have declared 12½ per cent. out of last year's profits on the £1,844,750 of ordinary capital were it not that they have placed £100,000 to reserve and increased the carry forward by £14,200 to £85,000.

The first yearly profit of the North British Locomotive Company, the great combine, after making due allowance for depreciation, is £193,100. When the combine was made the shareholders were assured that the average profit for the previous five years was sufficient to pay 5 per cent. on the preference and 10 per cent. on the ordinary shares. The sum required to do this is £150,000, so that the prospectus announcement is this year at least justified by results. Nearly all the orders executed during 1903 were for Indian, colonial and foreign railways.

Troubles in the Cleveland Trade.

The secretary of the Cleveland and South Durham Federation of Blast Furnacemen, in his annual report, says the latter part of 1903 was far from satisfactory to those engaged in the production of pig iron. At the present selling price of iron the cost of material makes it almost impossible for hematite makers on the west coast to carry on their works at a profit. Out of a total cost of £2 18s. 6d. per ton of pig iron, the ore costs £1 9s., coke £1 2s., limestone 1 shilling 6 pence, labor 3 shillings and standing charges 3 shillings, the cost of labor being so small that if furnacemen worked for nothing it would not help manufacturers much.

S. G. H.

Labor Notes.

The Bates Machine Company, Joliet, Ill., on March 18, secured a writ of injunction against the International Association of Machinists and its members. The writ granted is a sweeping one, prohibiting interference of any kind by the defendants. The company have also brought suit for \$200,000 damages against the same defendants. Under the protection of this injunction the company are this week endeavoring to reopen their plant.

The Central Federated Union of New York City decided at their meeting on Sunday that the proposed amendment to the eight-hour law, so that the Staten Island ferry boats may be competed for by local ship-builders, should not be passed by the State Legislature. The agitation for this amendment was started by the unions, but they now say that as it took 40 years to get the municipal eight-hour law enacted, it should not be amended, even if the contracts are placed outside of the State of New York.

The Employers' and Business Men's Association has been incorporated at New Albany, Ind. Its purpose is set out in the articles of incorporation, in part, as follows: "It is the purpose of the association to promote the stability of business, the employment of labor, whether organized or unorganized, to discourage strikes or lockouts and to oppose boycotts and kindred movements; also to protect the members, community and all persons who desire to work, from unlawful interferences, such as strikes, lockouts, boycotts and similar movements; to protect the members in the inalienable right to manage their own affairs without domination or coercion by any organized movement; to make it possible for any person to obtain employment without being obliged to join a labor organization." The association starts out with a membership of ten of the best known business men of the city.

L. W. Powell, formerly assistant to President T. F. Cole, of the Oliver Iron Mining Company, Duluth, Minn., has been appointed vice-president of the Pittsburgh Steamship Company, with headquarters at Duluth.

The Iron Age

New York, Thursday, March 24, 1904.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.

Industrial Trusts.

The public mind is being again inflamed over the trust question, and many are bidding for public favor by fervid denunciation of monopoly and its evils. It is urged that not only shall legislation be rendered more stringent and effective, but the demand is made that the executive power be availed of to the utmost. The term trust seems now to be indiscriminately applied to large concentrations of interests, be they in the industrial field, in transportation, or in banking. Yet the conditions which apply to each group, so far as they affect the fundamental right of the State to intervene, are very different. A franchise to build a railroad, with its right of eminent domain and its possibilities of restricted competition, is quite a different matter from an act of incorporation of a manufacturing company. In the case of the public carrier the State, as the representative of the public, has well defined rights and duties. In the case of a simple industrial undertaking the State has certain police powers, but should not intervene beyond that. For the sake of certain mutual advantages the State grants to manufacturing enterprises certain limited monopoly rights, conspicuous among which are patents. For the sake of revenue and of certain advantages to the whole community the State has passed certain laws restraining the free importation of foreign made goods. If the State at the demand of the electorate decides to repeal the tariff, the industrial interests of the country must assent. But the State has not the right to intervene in the operations of an industrial corporation simply because it is large, or powerful, or particularly prosperous. To limit the right to associate together for a common lawful end, even if that end is the control of the means of production of an article of general consumption, is to strike at the sacred right to property, which Anglo-Saxon men will defend to the utmost. The State may decide that the mineral deposits on the public land shall not be transferred to individual ownership. The State may decree that patent monopoly shall cease. The State may repeal our tariff laws. But the individual has never delegated to the community his right of freedom of action in associating himself with others in the pursuit of lawful undertakings, among which undoubtedly is that of producing articles for the consumption of his fellows. This country is not ripe for socialism, and has not had much encouragement from any successes due to letting others manage the work of individuals freely associated. It may be confessed that there has been a growing disposition during the past few decades to turn to the Government altogether too much for help in undertakings which should have been carried through and have been managed by individual effort. We do not need for the development of our resources and for the working out of our magnificent future more extended or more frequent intervention of the State. What we do want is more of the sturdy self reliance, independence and enterprise of individuals working together toward a common end. If those associations are very large or very comprehensive, they may or may not be more effective and successful.

Theoretically, our modern industrial trusts hold out the hope that they will be more effective. As a matter of fact, the experience of the past few years has rather cooled the ardor of those who had hoped that the trusts, as organized, represented a distinct advance in modern economic production. The majority have been distinctively disappointing in that respect. Their career since their formation has certainly not justified fully the hopes of those who favored them, nor has it realized the fears of those who saw in them a serious danger to the success and rise of the individual or the small group who dared to enter into competition with them in their chosen field.

The Business Situation.

At present encouraging features predominate. The general demand for iron and steel has shown a remarkable change for the better as compared with conditions prevailing at the opening of the year. All along the line, from pig iron to highly finished products, the volume of business has greatly augmented, and not only have weak points been strengthened, but some significant advances in prices have been made. The greatest change for the better has occurred in pig iron. The downward movement which was so marked during the last quarter of the past year has not only been arrested, but the trade has made a quick change of front, recovering a considerable part of the decline. An unexpected development in this branch was the purchase of Bessemer pig iron by the United States Steel Corporation, whose requirements in this line were supposed to have been amply met by the increase in their facilities for pig iron production. The trade was electrified when the fact was ascertained that the purchase of this pig iron was not simply for the purpose of putting backbone into the market, but was compelled by the necessities of finishing departments. Since that event the whole trend has been in the direction of improvement. The demand for highly finished products has increased to such an extent that the facilities of some of the steel works have been taxed to furnish the billets required.

Other developments affecting trade have also been of a favorable character. The Northern Securities decision, which had been hanging over the stock market, threatening great interests with direful results, has proved to be a much less seriously disturbing factor than had been expected, and the leaders in financial operations have taken fresh courage, as shown by the upward movement in stocks. The controversy between the bituminous coal operators and the miners in the Central West has been amicably settled, and the danger from that quarter of serious dislocation of transportation and industrial interests has been eliminated for at least two years. The collapse in cotton speculation cannot be regarded in any other light than as distinctly favorable to general business interests. Last, but not least, timely rains have fallen throughout the winter wheat belt, and apprehensions of the failure of that crop have been averted for the present. Some of these factors in the general business situation are of a negative character, it is true, but they were so pregnant with the elements of danger that their favorable adjustment makes them of great importance in considering the situation.

There is danger, however, that the situation may be regarded too favorably. The point must not be overlooked that a very large part of the heavy demand for iron and steel must be credited to the usual spring trade. We have passed through an unusually severe winter. Outdoor operations had been impeded to a greater extent than for many years. Railroad companies had their operations

most seriously interfered with, and the movement of both raw materials and finished products was heavily checked on this account. Again, the rapid decline in the demand for iron and steel last year caused a restriction of production through the latter months which brought the output of pig iron far below what might be considered a normal falling off. The opening of spring trade under such circumstances brought about a rush of orders like a flood, filling the stream of commerce bank full. The question just now is whether the stream will continue to be filled or whether the volume will diminish. That the latter is to be expected may be demonstrated by considering the condition of the railroad demand. The railroads constitute the greatest factor in the consumption of iron and steel. We have never had a boom in the iron trade of this country which did not depend mainly upon the heavy requirements of the railroads. The poor years in the iron trade have always been those in which the railroads have been small buyers. This year their advance orders for rails have been light, and from present prospects it is not likely that they will take more than half the capacity of the rail mills. The severity of the winter has greatly damaged the motive power of railroads in the North, and it is possible that locomotives may be in good demand to replace those worn out or incapacitated, but the demand for cars, bridges and other material is not likely to be anywhere near the average demand of the past three years. The railroad companies, with few exceptions, are not expanding their facilities or making betterments. With the railroad companies cutting a comparatively unimportant figure as consumers in the iron trade this year, it seems absolutely certain that as the weeks pass by the demand for iron and steel will fall further under the capacity for production. It must be borne in mind that never before have the iron and steel works of this country been in such generally good physical condition as they now are. The percentage of producing capacity disqualified for competition under declining prices is less than ever before, and new plants are getting into operation. These are facts which will afford food for reflection to those who are inclined to believe that the depression is completely past and that the country is again to enjoy a prolonged season of full employment.

Reduction in Wages in Union Sheet and Tin Plate Mills.

As a result of the meeting of the general executive board of the Amalgamated Association held in Pittsburgh last week, that organization has agreed to make a reduction of 20 per cent in wages in union sheet and tin plate mills. The meeting convened on Thursday morning, March 17, and was in session until the following Saturday evening until 10 o'clock. The 20 per cent. reduction in sheet mills includes the 10 per cent. reduction made in independent union sheet mills about six weeks ago. The following tables show the old 1903-'04 scale, together with the new rates. It should be noted that the new scale of wages in sheet mills is based on 2½ cents for gauges 26, 27 and 28, instead of 3 cents, as in the old scale. The lower scale went into effect on Monday, March 21, and continues in effect until Monday, April 2. In the meantime the Amalgamated Association officials will submit the matter to the lodges for a vote, and if the vote is favorable the reduction will continue in force until June 30 next, the date of expiration of the present scale year. Under the reduction just made the same rates apply for rolling both iron and steel sheets, the scale being as follows:

Sheet Mill.

WESTERN SCALE OF PRICES.

It is agreed that when the actual average selling price of Nos. 26, 27 and 28 gauge plain sheet steel f.o.b. mill is

2½ cents per pound the wages for rolling on a sheet and jobbing mill shall be as follows, with 2 per cent. additional for each one-tenth advance above said 2½ cents selling price, and 2 per cent. decline for each deduction of one-tenth to said 2½ cents selling price:

Gauges.	Price for rolling steel, per ton, 2240 pounds.	
	Old scale.	New scale.
No. 8 and heavier.....	\$3.60	\$2.88
Nos. 9 to 11.....	4.00	3.20
Nos. 12 to 14.....	4.80	3.84
Nos. 15 to 17.....	5.55	4.44
Nos. 18 to 21.....	6.75	5.40
Nos. 22 to 24.....	8.80	7.04
Nos. 25 to 26.....	10.12	8.16
No. 27.....	11.00	8.80
No. 28.....	11.71	9.37
No. 29.....	12.30	9.84
No. 30.....	13.20	10.56
No. 31.....	17.10	13.68
No. 32.....	20.80	16.64

When slabs are being worked the reduction is to be only 10 per cent. instead of 20 per cent., as given in the above table. The reduction of 20 per cent. applies in the sheet mill hands scale and also for roughing and catching on sheet and jobbing mills.

Tin Plate Scale.

The Amalgamated Association also made a straight reduction of 20 per cent. in the tin plate scale, which became effective on March 21, and continues in effect until April 2. The present scale allows the roller on Nos. 8 to 11 gauge \$1.71 a ton, and this is reduced to \$1.37. On gauges 25 and 26 the rate for rolling is \$3.94, and this is reduced to \$3.15. On gauges 27 and 28 the rate is \$3.99, and this is reduced to \$3.19. On gauges 29 and 30 the rate is \$4.18, and this is reduced to \$3.35. The basis of the tin plate scale, which was formerly \$4.20 per box, was reduced to \$3.50 per box. On each 10 cents increase in the price of tin plate per box above \$3.50 the men will get 2 per cent. advance, and on each 10 cents per box decrease a reduction of 2 per cent. will be made until the price reaches \$3.50 per box, which is the base price and below which wages will not go. These heavy reductions in wages made by the Amalgamated Association bear out the statement made in these columns last week that the affairs of the organization were in a critical condition. It was absolutely necessary for the Amalgamated Association to do something radical in the way of wage reductions to preserve its existence, and the cut of 20 per cent. in sheet and tin plate mills is the result. The association was almost certain to lose a number of important sheet and tin plate mills, but this action will likely hold them until the expiration of the scale year on June 30 next. After that date it is practically certain that a number of the larger sheet and tin plate mills will break away from the Amalgamated Association, as they have become very tired of its methods.

The Niagara Ship Canal an Essential Factor in Interstate Commerce.

The Niagara Ship Canal, for which the Federal Government is asked to appropriate \$4,500,000 as a necessary complement to the 1000-ton barge canal for which the Empire State has appropriated \$101,000,000, is being advocated by all the lake carrying interests and the chambers of commerce of the great lake cities as being essential to interstate commerce. At the hearing before the Rivers and Harbors Committee in Washington, March 25, the commerce of the great lakes will be represented by one of the strongest delegations ever sent to Washington to urge the passage of the measure; for this is conceded to be a project of national importance and of national necessity in connection with the enlarged Erie Canal. The proposed Niagara Ship Canal is to extend around the rapids at the head of Niagara River at Buffalo, alongside of the Erie Canal, a distance of two miles—from the foot of Maryland street to the foot of Squaw Island—with locks and basins, and will throw open to the deep draft vessels of the great lakes many miles of water frontage between Buffalo, Tonawanda and Niagara Falls. It will afford direct connection from Lake Erie to the enlarged Erie Canal and provide adequate terminal and transfer facilities for the

transfer of cargoes of grain, iron ore, copper, lumber and other commodities from lake vessels to the 1000-ton canal barges. Among those who are expected to speak before the Rivers and Harbors Committee and present arguments in favor of the Ship Canal are: William Livingstone, president, and Harvey D. Goulder, general counsel of the Lake Carriers' Association; James J. Hill, president of the Great Northern Railroad; W. C. Edgar, editor of the *Northwestern Miller*; Col. Livermore of Boston, head of the Calumet & Hecla Mining Company; John G. Milburn of New York and prominent men of the chambers of commerce of Duluth, Minneapolis and other shipping centers of the Northwest, Buffalo and New York City.

Scotch Iron and Steel Notes.

The Scotch Steel Combination.

GLASGOW, March 10, 1904.—The combine of Scotch steel makers, to which I have referred in previous letters, was brought before the House of Commons this week by Austin Taylor, who asked the president of the Board of Trade "if his attention has been called to a recent combination of Scotch steel makers, whereby a minimum price, with heavy penalties, has been fixed for Scotland, while these makers are delivering steel at lower prices in the Midlands, and, if so, whether the Government intend to take any steps to protect English steel makers against this form of competition?" Mr. Balfour replied: "I am aware of the combination referred to. The matter is not one which seems to call for any action on the part of the Government." Of course not. The Scotch combine is not in control of production and has none of the essence of monopoly. It is simply an association of makers who bind themselves by penalties not to sell below association prices in certain markets. These markets are Scotland and Ireland; anywhere else they can sell for what they please. If they go and undersell English makers in England, English makers will simply come and undersell them in Scotland.

No fault can be found with the Scotch steel makers for forming an association to regulate prices, just as the bar makers and hoop makers and others do in England. But one may question the wisdom of the associated makers in putting up prices too much. After raising steel ship plates to £5 15s. and angles to £5 5s., they have now advanced bars to £6 5s. per ton. They are prevented from advancing boiler plates by the competition among the English makers. So far they have held their own, and Scotch shipbuilders paying £5 15s., less 5 per cent., for their ship plates are on the same footing as the North of England shipbuilders who are paying £5 12s. 6d., less 2½ per cent. But English ship plates have come to Scotland before and will come again, unless a combination which is talked about between the Scotch and English steel makers be effected. If it is, there will be nothing to keep out either American or German plates, but a nice range of prices will tempt them. Personally, I do not think the Scotch steel combine will work out for the benefit of those engaged in it. But meanwhile it serves their purpose; it is a perfectly legitimate arrangement, and it is not a combination in restraint of trade.

The Shipbuilding Outlook.

It would certainly restrain trade if it made shipbuilding material so dear as to paralyze the demand for new ships, but it has not done so yet. Indeed, the prospects are now that shipbuilding will improve later in the year, as the war, if continued, must divert a good deal of shipping and cause some demand for ships by the belligerents. Already the demand for second-hand ships is reviving, and it is noteworthy that a good many orders for new vessels are from the owners of tramp steamers, who seem to have made up their minds that they cannot do any better by waiting, and that by the time their new vessels are ready there will be more profitable opportunities of employment for them. Shipbuilders are not at present working at a profit—at least as a rule—and they will need higher, rather than lower, prices for any new contracts they undertake. At present employment in the Clyde shipyards is far below the

producing capacity, and some of them have practically nothing on hand and nothing to look forward to. Consequently the number of unemployed shipyard workers is considerable, and there is a good deal of distress in some of the riverside communities. The steel works are now fairly well employed, and malleable iron makers also are finding more to do than at the end of last year, but our industries are far from being "full peg." I hear this week of the charter of a steamer to bring 5000 tons of steel billets from Baltimore, United States, to Swansea or Cardiff at 9 shillings 9 pence freight.

Iron and Steel Markets.

There is little to report of the pig iron market. A fair business continues to be done with home consumers, but the demand from foreign customers, with the exception of Italy, is quiet. Shipbuilding steel has been advanced in Scotland up to the level of prices ruling in England, but not much business has been put through since the advance. The steel rail trade continues very dull, and the competition with America for any export orders is exceptionally keen. A cargo of Canadian pig iron has just arrived here from Sydney, Cape Breton, making the second this year. On the other hand, our exports are declining, for February shipments were only 47,565 tons, as against 72,352 tons in February, 1903, according to the Board of Trade, though the figures are disputed here.

A Boiler Feed Pump Contract.

A Glasgow firm, John Cochrane & Co., have secured the order for the boiler feed pumps for the London County Council electricity generating station at Greenwich, although their price is above that of four other tenderers. Messrs. Cochrane asked £3618; the lowest quotation is £3030, and that of the highest of the 33 firms submitting tenders was £8483. There were several Scotch firms on the list—Bruce, Peebles & Co., Edinburgh; Andrew Barclay, Sons & Co., Limited, Kilmarnock, and Mirrlees, Watson & Co., Limited, and Harvey & Co., Glasgow. The committee, reporting on the tenders, state that the working of the steam plant will be dependent on the efficiency of the pumps, and it is of the greatest importance that these should be of the best type obtainable, as failure would result in the dislocation of the working of the tramways throughout the whole of South London. The committee were advised by their technical officers that the pumps proposed by Cochrane & Co. were "better suited to the Council's purpose" than those offered by the firms whose tenders are lower in amount, and therefore the committee recommend the acceptance of the tender. The great variation in the amounts, from £3030 to £8483, is due to each firm tendering for its own standard design of pump. Bruce, Peebles & Co., Limited, are to supply to Cochrane & Co. the electrical motor for driving the pumps.

Turbine Steamships Best in Rough Weather.

At the launch of a new turbine steamer at Dumbarton for the Irish cross channel service, James Denny said he did not think Mr. Parsons realized, and certainly they (Denny & Co.) did not realize, the remarkable performances that turbine steamers would give in rough weather. In the English Channel the "Queen," as compared with the paddle steamers, had an average superiority per run in ordinary good weather of 8 minutes, but in bad weather her advantage ran as high as an average of 20 minutes. In the circumstances he thought the owners of the "Princess Maud" were thoroughly justified in deciding to fit turbine engines. Hugh Brown, for the directors, said he had no doubt that in introducing the turbine they had done right, and that the result of the experiment, for it was an experiment so far as they were concerned, would give the utmost satisfaction, not only to the railway companies but to the traveling public whom they desire to serve.

The three new first-class battle ships of 18,000 indicated horse-power, the "Britannia," the "Hibernia" and the "Africa," for which contracts have been placed by the Admiralty, are to be fitted with Babcock & Wilcox watertube boilers. Each vessel will have 18 boilers of a total heating surface of about 40,000 square feet and a total grate area of 1250 square feet. Babcock & Wilcox have also received the order for the boilers for the Italian first-class battle ship "Napoli," of 19,000 indicated horse-power.

This vessel will have 22 boilers, having a total heating surface of 56,200 square feet and a total grate area of 1600 square feet.

The Admiralty have decided not to publish the report of the Torpedo Boat Destroyer Committee appointed to inquire into the strength of the destroyer "Cobra," which was lost in a gale in the North Sea, and into the question of the scantlings of destroyers generally. The main substance of the report is on the allegation that the "Cobra" broke her back owing to hogging and sagging alternately when riding on the crest and trough of the waves. The committee indicate that it was not obvious, from an examination of the design and after hearing the constructors and the survivors, how this could have occurred, but that there might have been a flaw in the material. As to the strength of destroyers now in the navy their views are reassuring, and they have entered into the question very fully. The committee who have worked so well consist of Dr. John Inglis, Professor J. H. Biles and Archibald Denry, all of Glasgow, and Mr. Deadman of the Admiralty.

The engines of all future British naval ships are, according to the *Glasgow Herald*, to be so designed that the screw propeller will turn outward for driving the vessel ahead. The practice has hitherto been to fit the engines to turn the screws inward, but experience has shown that this causes a loss in maneuvering qualities, and also in propulsive efficiency, especially where the propellers work close to the hull of the ship. Experiments in Italy have confirmed this view. In the French navy experiments have been made with the same result, and France has decided that all small cruisers and torpedo craft shall be fitted with out-turning screws.

B. T.

Scrap Iron Classification of the Republic Iron & Steel Company.

Following is the classification of scrap iron by the Republic Iron & Steel Company, Chicago, as revised February 1, 1904:

Iron Axles: Iron railroad car axles; M. C. B. sizes, free from locomotive axles or defective or imperfect forgings.

Steel Axles: Steel railroad car axles; M. C. B. sizes, free from locomotive axles or defective or imperfect forgings.

Iron Rails: Standard section T rails, original weight 50 pounds per yard or heavier, minimum length 4 feet, free from frogs, guards, switches, turntable and curved rails.

Steel Rails: Standard section T rails, original weight 50 pounds per yard or heavier, minimum length 3 feet, free from split heads, frogs, guards, switches, curved and turntable rails.

A. No. 1 Railroad Wrought: Heavy wrought iron from railroad shops and cars, 6 inches and longer, including links and pins.

B. No. 2 Railroad Wrought and Track Scrap: Heavy wrought iron and soft steel scrap from railroad shops and cars, 2 inches and longer, including track bolts, spikes, nuts, channel bars and mixed standard angle bars and splices.

C. Shafting: Iron and soft steel, 1½ inches to 4 inches round and square; 4 feet and longer, in straight bars.

D. No. 1 Wrought: Heavy wrought iron and soft steel fagoting scrap. Bars ¾ inch to 4 inches, round or square; flats ¼ inch thick and heavier, 4 inches long or longer, including wagon axle, horse shoes and wagon tires, exclusive of other shapes or bent pieces.

E. No. 1 Country Wrought: Heavy wrought iron and soft steel scrap, including buggy tires, horse shoes; not less than 75 per cent. to be fagoting scrap, free from cast, malleable, hard steel and sheet iron.

F. No. 1 Mill: Iron and soft steel bars, not less than ¾ inch round or square, and flats not thinner than No. 12 wire gauge, including heavy railroad sheet, tank in separate sheets and rings, boiler sheets and rings, clean pipes and flues, heavy punchings and clippings, and strictly soft steel agricultural implement shapes.

G. No. 2 Mill: Iron and soft steel hoops and sheets, railroad sheets, cotton tie clippings and ties, and iron too

light for No. 1 mill; wire rope 10 feet lengths and under; wire netting, free from galvanized or tinned stock, tangled wire and skeleton sheet scrap.

H. No. 1 Busheling: Iron and soft steel pipes and flues (clean); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings; nothing to be over 8 inches long or wide, free from galvanized or tinned stock.

I. No. 2 Busheling: Cut hoops, sheet, cotton ties and similar light material; nothing to be over 8 inches long or wide; bundled wire and bundled sheet suitable for busheling without further preparation; bundles not to weigh over 40 pounds and not to be over 15 inches in height, width or length; all free from hard steel, cast and malleable, and galvanized or tinned stock.

J-K. Axle Turnings: Wrought iron and soft steel railroad car axle turnings and chips.

L. Turnings: Machine wrought and soft steel, clean and free from borings and drillings, other metals, dirt and lumps.

M. Drillings: Wrought or soft steel, clean and free from other metals, dirt and lumps.

N-O. Mixed Borings and Turnings, and Cast Borings: Clean and free from other metals, dirt and lumps.

P. No. 1 Boilers, Cut: Boiler sheets and rings not under 30 inches in diameter, all rivets cut.

Q. No. 2 Boilers, Cut: Boiler sheets and rings, under 30 inches in diameter, and riveted flues, not under 16 inches in diameter, all rivets cut.

R. Boiler Shop Scrap and Shipbuilding Shop Scrap: Wrought and soft steel bars, shape and plate ends, punchings and shearings, free from curly clippings and hard steel.

S. No. 1 Cast: Machinery and railroad cast, no piece to weigh over 75 pounds.

T. Stove Plate: Stove plate and railroad locomotive grate bars, free from burnt iron.

U. Bundled Sheet Scrap: New sheet clippings and shearings, securely bundled; bundles not over 15 inches in height, width or length (may be round or square), and weighing not over 40 pounds each, of uniform solidity, not pressed by machinery.

V. Pipes and Flues: Wrought and soft steel. Must be free from dirt or lime, and from riveted seams, and malleable or cast iron fittings.

On Wednesday night, March 23, the members and friends of the Engineers' Society of Western Pennsylvania visited the plant of the Frank-Kneeland Machine Company department, at Fifty-fourth street and Allegheny Valley Railroad, through the courtesy of the United Engineering & Foundry Company, I. W. Frank, president. The plant consists of foundry, machine shop, erecting shop, pattern storage building, &c. On the floor were a 40-inch blooming mill, large hydraulic shears and large gear shears weighing 150 tons, which were completely erected and ready for shipment. The visitors were conducted through the plant by Isaac W. Frank, Edward Kneeland, G. W. Knotts, assistant manager of the works, and Frank I. Ellis, assistant engineer of the company.

At Pittsburgh last week William G. Park and the Union Trust Company, receivers of the Clairton Steel Company, applied to the United States Court for permission to renew a note for \$400,000 given to the City Trust Company of Boston, the renewal to extend four months. The note was given prior to the receivership, and the present management expect in the next four months to be able to meet the obligation, at least in part.

The plant of the Canonsburg Steel & Iron Works, at Canonsburg, Pa., has been started up after a shut down of several weeks, the employees accepting a reduction of 20 per cent. in wages. The concern are manufacturers of steel and iron sheets for stamping, enameling, deep drawing, tinning and galvanizing, and also stove and range work. John F. Budke is president and general manager, John M. Watson, vice-president and business manager; William H. Paxton, treasurer, and George W. Retberg, secretary.

The National Eight-Hour Bill.

Arguments Before Senate and House Committees.

WASHINGTON, D. C., March 22, 1904.—The National Eight-Hour Bill was the subject of argument during the past week for three days before the Senate Committee on Education and Labor, and for one day before the House Committee on Labor, the witnesses including prominent manufacturers and the representatives of manufacturing and employing interests in half a dozen different states. Among those heard were Oliver Crosby, president of the American Hoist & Derrick Company, St. Paul, Minn.; Joseph Beck, secretary of the St. Paul Jobbers' and Manufacturers' Association; Wallace Downey, president of the Townsend-Downey Shipbuilding Company, New York; W. C. Shephard, secretary of the Builders' Council and Exchange, and the Employers' Association, Wilkes-Barre, Pa.; J. E. Patterson, of J. E. Patterson & Sons, manufacturers of woodwork, and representatives of the Manufacturers' Association, Wilkes-Barre, Pa.; Daniel Davenport, of Bridgeport, Conn., executive agent of the American Anti-Boycott Association, and John McIntyre, secretary of the executive committee of the United Typothetæ of America.

Manufacturers and Employers Aroused.

A significant feature of the arguments presented by these witnesses was the evidence contained therein that manufacturers and employers throughout the country are becoming aroused to the danger that menaces all industries from the pending bill, which in past Congresses has seemed to be understood only by certain iron and steel manufacturers, shipbuilders, &c., through whose efforts its enactment was prevented for a number of years. The course adopted by Chairman McComas of the Senate Committee, in the conduct of these hearings, has subjected him to much severe criticism from those who have followed the progress of this measure in the two houses. Instead of occupying the position of an impartial presiding officer open to conviction, he has become the ardent partisan of the pending bill, and has employed every conceivable device to minimize the effect upon his colleagues on the committee of the arguments presented by manufacturers and employers, arbitrarily limiting the time of those who addressed the committee, undertaking to restrict the scope of their arguments, and incorporating in the official record of each address remarks of his own intended as a reply to the objections raised to the pending bill. In one breath he has stated that the bill was directed especially against the shipbuilding and armor plate industries of the country, and "would not affect to exceed three per cent. of the manufacturers of the United States," and in the next he has defended the bill on the ground that, by indicating the position of Congress and the Government, it would go a long way toward bringing about a universal eight-hour day.

But what Senator McComas' critics regard as his most objectionable utterance is a statement which he incorporated in the record at the close of the hearing on the 17th inst., and which was subsequently sent broadcast over the country through the press associations, to the effect that a studied effort was being made on the part of certain opponents of the bill to arouse the opposition of a great many manufacturers who would not be affected in any degree by its passage. He added that he was greatly surprised at the misapprehension which he said existed among manufacturers with regard to the scope of the law, which was by no means as comprehensive as was commonly supposed. Of course, Senator McComas' purpose is to create the impression among manufacturers as a class that the bill does not affect their interests, and hence that they should not seek to bring pressure to bear upon Congress to prevent its enactment. Equally, of course, the manufacturers of the country are coming to recognize in Senator McComas simply a strong partisan of the bill whose personal opinion with regard to its provisions would be worthless for their protection should the measure become a law. Taking Senator McComas at his word, however, that the bill is directed almost entirely against the shipbuilders and armor plate makers, it is not difficult

to understand the indignation with which this statement has been received by representatives of these industries who have recently appeared before the committee, some of them within a few hours after their appearance before the Committee on the Merchant Marine and Fisheries, which is now engaged in considering measures for the relief of the moribund shipbuilding and ship-owning interests of the country.

Some of the Arguments.

Daniel Davenport, of the American Anti-Boycott Association, was the first witness before the Senate Committee. His argument followed the lines of that heretofore submitted to the House Committee, but he dwelt with special emphasis upon the predicament of the contractor, who, under the bill as amended by the Senate Committee of the last Congress, is made responsible for all the acts of his sub-contractors, although unable to protect himself in the event of their failure to comply with the law. He was followed by Oliver Crosby, president and engineer of the American Hoist & Derrick Company, St. Paul, Minn., and representing the Commercial Club of St. Paul, the Foundrymen's Association and the Association of Machinists of the cities of St. Paul and Minneapolis. Referring to the comment of the chairman that the bill was only meant to apply to shipbuilders and a few large contractors, Mr. Crosby said that, in his opinion, it affected all manufacturers. Continuing, he said:

My concern has built some gun carriages for the War Department and several large cranes for the Navy Department, and we have made a great many minor articles for the equipment of our sea coast defenses. All of these contracts have been awarded to us in competition, and we believe on the merits of our work. Within the past ten years probably 10 per cent. of the output of our plant has been supplied to the Government, and in that length of time we have brought into our State and distributed among our workmen more than \$1,000,000. Our business is not as large as that of many other Government contractors, but there are a great many who are in substantially the same position that we are, and who will be obliged to choose between their Government work and their commercial work in the event of the passage of this bill.

While building mortar carriages for the Government we were subject to a penalty of \$25 a day for failure to complete them on time. It would not amount to much for one day, perhaps, but in a month it becomes a respectable sum. Under this bill we would be subject to constant delays and would not be able to run our plant overtime to make them up. It is not always the manufacturer's fault that delays occur. We are now building a crane for the Boston navy yard on a contract let to us in December. Before putting in our bid on that work the directors of our company examined this bill very closely and finally decided that it would not apply to any contract made before its passage; but I will tell you very frankly that if this bill had been a law our company would never have put in a bid for that crane. We could not afford to do it.

To fill a Government contract is exceedingly difficult, and I do not say, with any intention of complaining, that what is called "red tape" is unnecessary, or that the specifications on Government work are too exacting. I believe the requirements are necessary in carrying on such an enormous amount of work as the Government is obliged to contract for. But in complying with these specifications we are obliged to supply ourselves with materials that will stand Government tests and conform to their regulations, and oftentimes we have to wait for a report to be sent to Washington, and this results in a serious interruption to the work.

Now, there never has been a case when I found myself in a tight place of this kind that our men were not willing, ready and anxious to help me out in every way, and in many cases we have been obliged to work our force 10, 11 and 12 hours a day for a short period in order to meet our obligations. This bill would prevent all that, and if we did it, it would cost us \$500 a day to work 100 men a few minutes extra. For that reason, among others, we would not feel safe in putting in a bid for this sort of a contract, even if we were running our plant on an eight-hour day.

Wallace Downey appeared as the representative of the Metal Trades Association of New York. The chief feature of his argument, which was made on somewhat different lines from that submitted to the House Committee a fortnight ago, related to the effect of the New York eight-hour law upon the shipbuilding industry of that State, which was commented upon editorially in *The Iron Age* of the 17th instant.

Mr. Beck, representing the manufacturers of St. Paul and Minnesota, urged the committee not to pass any law that would reduce the number of concerns in the country able to bid on Government work. All the people of the country are interested in keeping down the national expenditures as much as possible, yet any legislation that

would force manufacturers to adopt an eight-hour day on Government work, or would make it necessary for the Government to do its own work, must add enormously to the burdens of the taxpayers. Said he:

Let me give you a single illustration in this connection. Some years ago the Government decided to build two warships, the "Raleigh" and the "Cincinnati." The cost was limited by the appropriation bill to \$1,100,000 each. The Government asked for competitive bids, and the Cramp Ship & Engine Building Company offered to construct the vessels for \$1,225,000 each and to complete them in three years. The Navy Department could not let the contract, because the bid exceeded the amount of the appropriation. The Government, therefore, built those two ships in the navy yards, and on the eight-hour basis. One of these vessels cost \$1,890,000 and the other \$1,900,000, as against the Cramp bid of \$1,225,000, and it took six years to build them. The total price paid for those two ships built in the Government yards would have covered the cost of three built by the Cramps.

Both Senate and House committees will give hearings during the present week, but an effort will be made to report the bill to both houses before April 1. W. L. C.

Iron and Industrial Stocks.

The past week has been characterized by somewhat wider fluctuations in prices of industrial stocks than has latterly been the case. Stimulated by the reports of increasing business, the United States Steel stocks made a sharp advance for several days, which had an effect on the general list. The Steel stocks were particularly strong on Thursday, under rumors that some good orders for steel rails were about to be placed. On Friday the announcement of the suspension of the great cotton operator, D. J. Sully, depressed the stock market, as speculators were fearful of financial troubles following his suspension. Some hesitation ensued on Saturday and Monday, but a better movement set in on Tuesday in connection with the extraordinary transactions in the securities of transcontinental railroads attending the announcement of the division of the holdings of the Northern Securities Company. The most important fluctuations in industrial stocks during the period mentioned were as follows: Can preferred declined from $39\frac{1}{4}$ to $35\frac{1}{2}$, ex-dividend, recovering to $37\frac{1}{2}$; Colorado Fuel declined from $29\frac{1}{2}$ to $28\frac{1}{2}$, recovering to $29\frac{1}{2}$; Pressed Steel common declined from $30\frac{1}{4}$ to 29 , recovering to $30\frac{1}{4}$, and the preferred advanced from 70 to 74 , declining to 71 ; Railway Spring preferred advanced from $72\frac{1}{4}$ to $74\frac{1}{4}$; Republic preferred declined from 44 to $42\frac{1}{2}$, recovering to $44\frac{1}{4}$; Tennessee Coal advanced from $37\frac{1}{4}$ to $39\frac{1}{2}$, declining to $38\frac{1}{2}$; United States Steel common advanced from $11\frac{1}{2}$ to $11\frac{1}{4}$, declining to 11 and recovering to $11\frac{1}{2}$; the preferred advanced from $56\frac{1}{2}$ to $59\frac{1}{2}$, declining to $56\frac{1}{2}$ and recovering to $57\frac{1}{2}$; the 5 per cent. bonds advanced from $72\frac{1}{2}$ to $75\frac{1}{4}$, declining to $73\frac{1}{2}$ and recovering to $74\frac{1}{2}$. The last sales reported on Wednesday up to 1.30 p.m. were as follows: Car & Foundry common $20\frac{1}{4}$, preferred $70\frac{1}{2}$; Locomotive common 22 , preferred $82\frac{1}{4}$; Colorado Fuel $28\frac{1}{2}$; Pressed Steel common 30 , preferred 70 ; Railway Spring common $20\frac{1}{4}$, preferred $74\frac{1}{2}$; Republic common $7\frac{1}{2}$, preferred 44 ; Sloss-Sheffield common 39 , preferred $81\frac{1}{4}$; Tennessee 39 ; United States Steel common $11\frac{1}{2}$, preferred $57\frac{1}{2}$, new 5's $74\frac{1}{2}$.

The report of the J. A. Fay & Egan Company, Cincinnati, after deduction of charges and dividends, shows a surplus for the year ended February 1, 1904, of \$35,934, as compared with \$69,894 for the previous year.

The Niles-Bement-Pond Company's general balance sheet as of December 31, 1903, as filed with the Secretary of the Commonwealth, Boston, Mass., shows: Assets—real estate and machinery, \$3,617,026; merchandise, \$1,392,711; cash and debts receivable, \$2,152,581; New York office and fixtures, \$4347; investments, \$4,702,652; total, \$11,869,317. Liabilities—Capital stock, \$7,000,000; accounts payable, \$470,017; surplus, \$3,845,301; profit and loss, \$553,999; total \$11,869,317.

The only change in the directorate of the Otis Elevator Company at the recent annual meeting of the stockholders was the election of ex-Governor William Murray Crane of Massachusetts to replace John A. Roche, who recently died. The annual report, as of December 31, 1903, is as follows:

	1903.	1902.
Net after deducting charges, repairs, &c.	\$908,055	\$978,410
Preferred dividends.....	332,670	284,829
Balance.....	\$575,385	\$693,581
Common dividends.....	127,006	127,006
Balance.....	\$448,379	\$566,575
Depreciation.....	248,379	266,575
Surplus.....	\$200,000	\$300,000
Previous surplus.....	1,000,000	700,000
Total surplus.....	\$1,200,000	\$1,000,000

The annual report of the general manager of the Nova Scotia Steel & Coal Company, Limited, was submitted to a meeting of the directors held in Montreal on March 12, show-

ing a large increase in business and profit, the output of coal having considerably increased and the iron and steel plant having been fully operated during 1903. The profits were \$859,397.19, as compared with \$609,935.25 for the year previous. A quarterly dividend of 2 per cent. was declared on preferred stock and a half yearly dividend on the common stock of 3 per cent., leaving a balance of \$685,642 to be carried forward to the profit and loss account.

The Metal Trades Convention.

(By Telegraph.)

PHILADELPHIA, March 23, 1904.

With over 100 members present, the sixth annual convention of the National Metal Trades Association opened at the Walton Hotel here this morning. The schedule of topics to be discussed and the enthusiasm evinced by the members on these subjects promise a most interesting meeting. There are two topics which bid fair to absorb the greatest attention of the members. These are the relation of the national and local associations toward each other, and the matter of agreements with labor organizations. The views of acting President H. N. Covell on these topics were received with the greatest of interest, and the indications point to a very thorough discussion along the lines laid down.

The convention opened promptly at ten o'clock, and H. N. Covell, presiding officer, proceeded immediately with the important business, abbreviating as much as possible the dry routine usually encountered in such meetings. As a result of an excellently prearranged programme the appointments of committees and their ratification by the convention were quickly disposed of. They are as follows:

Convention: C. Bermingham, Toronto, Canada; C. E. Hildreth, Worcester, Mass.; G. K. Garvin, New York; E. E. Bartlett, Boston; F. K. Copeland, Chicago.

Strikes and Lockouts: E. C. Wells, Quincy, Ill.; O. P. Briggs, Detroit, Mich.; M. A. Neeland, Youngstown, Ohio.

Nominating: G. F. Steedman, St. Louis; J. C. Hobart, Cincinnati; M. H. Barker, Boston.

Wages and Hours: W. C. King, Buffalo; P. G. March, Cincinnati, Ohio; George T. Brown, New London, Conn.

Ways and Means: A. C. Pessano, Detroit; J. H. Schwacke, Philadelphia; J. D. Hibbard, Chicago, H. D. Beach, Bridgeport, Conn.; Wm. Lodge, Cincinnati, Ohio.

Constitutional Amendments: W. D. Sayle, Cleveland, Ohio; F. A. Scheffler, Harrison, N. J.; W. B. Morrison, Auburn, N. Y.

Auditing: E. Burkitt, Jackson, Tenn.; H. H. Latham, Chicago; F. Weber, Orange, N. J.

President's Report.

H. N. Covell, acting president, said in his report: As acting president, I welcome you to this the sixth annual convention of our organization. It is with extreme regret that I have to announce the resignation of S. W. Watkins, who has, with such signal ability, performed the duties of president for the past two years, and who had also rendered valuable service as a member of the Administrative Council previous to his election to the office of president. Owing to the severance of his connection with the National Electric Company Mr. Watkins was compelled reluctantly to resign the office.

The past year has been an eventful and prosperous one in the history of our association. There has been a very healthy and encouraging growth in membership; much has been done in the way of perfecting the details of organization; our finances were never before in such satisfactory condition, and, notwithstanding very heavy expenditures for defence and protection, the balance sheet shows a surplus in our reserve fund greater than ever before reached. The funds are distributed in a number of sound financial institutions in various sections of the country, and are drawing interest at the best obtainable rates. A number of strikes of greater or less extent have demonstrated to our members involved the value of or this is something we cannot avoid. Organized labor has rights and a standing in the community, whether we like it or not. If through conference we can impart some of our ideas, and we certainly can, it will be sowing seed

ganization. Although the strikes are not officially declared off, yet our members' shops have been filled with new men and are running full force.

Great credit is due to our commissioner, E. F. Du Brul, and to his able assistant, Secretary Wuest, for the painstaking, conscientious and successful manner in which the details of the organization have been conducted, and the work as carried out at headquarters is a credit alike to the gentlemen named and to the association.

Your treasurer and administrative council are deserving of the highest praise for the able manner in which they have served the interests of the association, and last, but not least, you, the members, are to be congratulated upon the *esprit du corps* which has always been a distinguishing feature of this association. No organization will succeed if it does not possess this very necessary factor, and the measure of success is in direct proportion to the loyalty which exists within its ranks.

Our association stands pre-eminent as the one which has not only adopted and published a declaration of principles but has adhered to it, and in the settlement of the disputes and strikes which have involved a number of our members there has been no deviation from these principles.

Endeavor to secure additional members. One of the most important of the questions which will claim the attention of this convention is that of the relation of the National association to the various local associations. Both are essential, one not more than the other, but one without the other will not accomplish what we strive for. There is a tendency on the part of members of local associations to be satisfied with the local alone, and they fail to appreciate the value of the National association. Should there be local metal trades associations established in the various cities, towns and communities, with no allegiance to a head and supreme organization, such a condition would be very similar to that in which Japan in her struggle would find herself if her army were composed of individual regiments, each directed by its own officers, and entirely independent of the other regiments in the army, owing no allegiance to and taking no orders or instructions from a supreme ruling center, working with no fixed purpose, or following no general plan of campaign, each for itself, and working out its own salvation with no thought of the others. The result would be disaster and defeat to the army which was so organized. There can be no two thoughts on this subject. It is a self evident proposition. It is easy to conceive how the members of a local association which has been successful in a struggle may have cause for a feeling of exultation and a sense of power, but they should at the same time remember that the result might be different at another time, and, above all, that they are organized for a common purpose with other locals. The adage "In union there is strength" should be remembered, for no truer words were ever spoken.

The element of expense may deter some from being members of both National and local associations. The fact must be borne in mind that neither can be maintained without some expenditure of money. The cost of maintaining a local association need not necessarily be great; salaries, rent and a few incidentals comprise the total of expenses. A concern joining the National association, however, pays into its reserve fund a proportional part, based upon its unexpended balance, as provided in the constitution. It is manifestly but fair that those becoming members should be on the same footing precisely as those who are already members. This ownership and participation in the reserve fund is an asset, and a firm retiring from business will have handed to it an amount equal to its share in the unexpended balance. To maintain and increase this reserve fund a certain percentage from monthly dues is set aside for this purpose, and a member pays his proportionate share to it. It is without argument that a reserve fund is a necessity, the larger the better. Ready cash at our disposal in the occurrence of labor troubles is a very important factor in the situation. Yet here again is an argument wherein the necessity of a National organization fully appears. It is not conceivable that any local association, except by tremendous individual drain, can accumulate a reserve

fund which will carry itself through a protracted strike and afford the relief and assistance which the National association can give to its members. I thoroughly believe in home rule. I believe that local situations can be dealt with better by a local association composed of men who are neighbors and associated with each other than they can be by strangers. At the same time, there must be some general policy on which all associations may stand—some supreme and guiding head to shape that policy. Our supreme head is the convention. The resolutions and rules determined upon by that body are in turn passed to the administrative council for execution. The administrative council is simply the executive branch of our government, whereby the constitution and by-laws and rulings of conventions are carried into effect. The words "supreme head" mean simply yourselves, and do not apply to a person or a group of individuals. Without a federation or amalgamation, which means nothing more than the pooling of individual interests, the local association would be as a ship without a rudder, first blown this way and then that way by every change of wind and current. Disastrous results would follow as surely as fate. Be loyal to your local first; that is good citizenship. Believe in it, work for it, help it, but beyond that be loyal to your National association. That is patriotism. A nation without it falls. Steal a leaf from organized labor as it stands to-day and apply it to our own cases. There is organization carried to a fine point. Local lodges, district lodges, national unions, then a federation of national unions. We should strive to reach that state of organization. We should be as ready to contribute our share toward maintaining the organizations as our employee is with his dollar dues per month in addition to unknown assessments. Much time and thought have already been given to a solution of the problem which confronts us. Undoubtedly the ideal proposition would be that there should be a local association in every city, or, in the case of isolated plants or small towns, in groups of the same, they in turn to compose districts and districts to make up the National. In other words, we should organize from the bottom up instead of from the top down, as we are now endeavoring to do. It means that every concern which joins a local must at the same time be a member of the National. The question of expense can be regulated by judicious legislation, and I trust that there may be full and free discussion of this question, and if some tangible result cannot be reached at this time that the subject may be referred to a competent committee, which may consider the matter in all its phases and aspects, and be prepared to announce its conclusions at some future convention or through communications by mail.

The question of our relation with organized labor is a most important one. I believe that the tendency is growing to a more liberal spirit; that it is a fact that more employers have come to view the situation in a broader and less conservative manner, and have eradicated from their minds the idea that all is absolutely bad in organized labor, and conversely wholly good on the employers' end. More lasting ultimate good may be accomplished by an endeavor to correct the abuses of organized labor than by crushing it (if such a thing were possible). I am of the opinion that no harm will be done, but that much good would ensue, by occasional conferences with representatives of organized labor. We cannot ignore the fact that organized labor is prominent in our nation's affairs. Were it not that labor is organized, this association would not be organized, and therefore in the mere fact of our own organization we recognize the organization of labor.

The use of the word "recognize" applied to labor organization is, perhaps, not a happy one. To use the word from the labor union standpoint would mean the adoption of the closed shop, minimum rate, hours of work, limitation of apprentices, and throughout the whole category of labor union restrictions, which is a condition strictly contrary to our declaration of principles, and is in no sense to be considered by this association. But using the word "recognize" in a broader sense, we cannot deny the fact of their existence. We recognize the fact of their existence, hence recognize them to that extent, and

which some day may take root and grow and thrive. If two persons disagreeing upon a matter should stand upon opposite sides of a street and hurl epithets, stones and sticks at each other, no good will be done to either. Surrounding property and passers-by would be liable to receive injury. The more stones thrown, the more angry would they become. It would be infinitely more sensible if both sides should conclude to come to the middle of the street and talk it over.

And so it seems to me that the National Metal Trades Association should meet organized labor in conference. I am a firm believer in national agreements. I do not mean any agreement, but agreements which must be based upon our fundamental principles, and this without any infringements of our rights as employers, citizens of the United States or members of the association. It is not logical that we should disparage or disapprove of agreements with organized labor as a body, when component parts, as represented by local associations, make local agreements, and are, in numerous instances, successfully operating under them to-day, and, in fact, using as a basis of the agreements a form officially sanctioned by this association.

This is a subject upon which there are widely divergent views entertained by our members. There is no better place than at this convention for a thorough ventilation and expression of opinion. Every member has a right to his own opinion and an opportunity to express it. I wish it distinctly understood that I do not favor an agreement wherein there is a single retraction of our rights nor of the principles which we believe are just, equitable and correct. Our principles must be maintained and upheld, no matter at what cost; but, at the same time, I feel that there is common ground on which we may stand without danger of impairment of our dignity or infraction of our tenets.

Reports of Other Officers.

The report of the treasurer showed a very gratifying increase in the balance in the treasury, despite the large expenditures of the year, and indicated that the organization is in a most flourishing condition financially.

The report of Robert Wuest, secretary, showed a net gain in membership for the year of 125 members, or 46.4 per cent., as compared with 1902. Among the shops of the members the average number of operatives per shop is 27 per cent. less than a year ago. As to changes in the number of hours under which the shops of the association are operating per week, the report showed that 9.7 per cent. more shops and 10 per cent. more employees are working 55 hours per week than was the case a year ago. This, it is stated, was in most cases due to voluntary reductions made by the employers, and that the reductions were made as a rule in the shops located in the larger cities. The report of Commissioner E. F. Du Brul was most enthusiastically received, and the reading of it occupied the balance of the morning session.

Committee on Legislation.

In the afternoon session the report of the Committee on Legislation said: "Our association has been actively engaged in a legislative campaign before the committees of Congress against the following bills: Eight-Hour bill, Anti-Injunction bill, Metric System bill and Power Boat bill." The report continues as follows: "We have reason to believe that none of the above bills will pass, due to the concerted effort on the part of all interested organizations and to the knowledge that Congress is gaining through such organizations as ours. The people are made familiar with such legislation and vigorously protest against it."

Commissioner Du Brul's Report.

Since our last convention the industrial situation all over the United States has been such as to command the closest attention and careful consideration on the part of all classes of the community, whether employers or employees.

Strikes and labor troubles during the year attained a frequency never before known. Boycott, violence and other methods of intimidation on the part of the labor unions have been greater than ever. We have witnessed the spectacle of large cities tied up by a teamsters' and

freight handlers' strike, at a cost of millions of dollars. We have witnessed a regular labor war in Colorado, conducted by the Federation of Miners, and financially assisted by the American Federation of Labor, requiring the maintenance in the field of the State troops for months at a time, and bringing about a condition of affairs which General Bates investigated on the behalf of President Roosevelt, and which, the general reported to the President, amounted to a state of anarchy and insurrection. The same scenes that existed in Colorado have been duplicated on a smaller scale by strikes in many parts of the country, so that to-day the union question is the one question most prominently before our people. As gloomy as the prospect has been, it has had some compensation.

THE VALUE OF ORGANIZATION.

The lesson learned by the members of this association above five years ago has since been learned by thousands upon thousands of employers and by hundreds of thousands of other citizens, whose interests have been diversely affected by this situation; that lesson was organization.

All over the country employers' associations have sprung up in different trades, and in numerous cities local organizations covering every kind of employers have been formed. In addition, the great public have manifested their interest in the eager formation of citizens' alliances, which include in their membership all classes of the community who are opposed to boycott, violence and kindred methods of coercion. Doctors, lawyers, preachers, school teachers, merchants, business men, manufacturers and working men alike join together in the citizens' alliance, to put down the evils that threaten to overwhelm our present political systems.

THE ANTI-BOYCOTT ASSOCIATION.

Since our last convention, at which Mr. Davenport addressed us regarding the necessity of forming a national organization whose primary duty it should be to enforce the laws, the American Anti-Boycott Association has been formed, for the purpose of fighting the boycott in all its forms and in all its phases, many of our members being members of that association, which is doing a magnificent work.

The National Association of Manufacturers, which has been leading the fight against the evils above mentioned in so far as they manifest themselves in Congress through pernicious legislation, has almost quadrupled its membership in two years. Finally, there has been formed a national federation of all the above sorts of organizations, whose main purpose is the enforcement of the law and the education of the people on these questions.

Everywhere, particularly in localities where one phase or other of the movement before mentioned has manifested itself, our members have always been in the front ranks, whether it be in Chicago, Minneapolis, St. Louis, Cincinnati, Philadelphia, New York, Boston, Baltimore, or in smaller cities, like Quincy, Elmira or Joliet, or Trenton.

THE OPEN SHOP.

Everywhere that this movement has taken hold it has been a source of gratification to the members of the National Metal Trades Association to know that their organization has been of assistance in training its members in this wider field of usefulness. They are glad to know that the National Metal Trades Association exercises much influence in many communities, and that its literature and its publications are widely read; that through its influence many men have gained information that they would otherwise have been slow to acquire. Perhaps the greatest source of gratification to our membership is the knowledge that our association's uncompromising fight for the open shop has not only been upheld by the Anthracite Coal Strike Commission in its verdict, but that it has met a hearty response from the whole American people, who are opposed to discrimination and unfairness of any kind. Our association has encouraged and assisted to the utmost of its ability and at considerable expense of time and money in the furtherance of all these movements, and, in your commissioner's judgment, it has been time and money well spent. No monetary value could be placed on its efforts in aiding the arousing of public opinion to the knowledge that menacing danger lurks in the present methods of unionism.

LOCAL ASSOCIATIONS.

The Employers' Association of Cincinnati, as one example, is absolutely and entirely due to the efforts of the members of the National Metal Trades Association, and the same with the organizations of Quincy and Joliet, Ill.; Elmira, N. Y.; Rutland, Vt.; Boston, Worcester, Springfield, Mass., and other points too numerous to mention.

The influence of our association in the legislative campaign is second only to that of the National Association of Manufacturers. Our effort in the direction of enforcing by legal means the right of a man to work legally as he wills, and the right of a man to run his own business legally as he wills, is second only to that of the American Anti-Boycott Association in the matter of legal procedure.

In the matter of taking care of our own members in times of strike and labor trouble, with every means at our command, our membership can feel that there is no association in any line of business that is superior. This is not boasting; it is a fact, and is called to your attention only that you may know the good work to which each member of this association has been a party, the results that work has secured in the shops of the members and the recognition of your work, for it is the work of every member.

In view of all the above, in measuring the work of the association for the year and the conditions demanding the large expenditures which we have made, our membership will certainly recognize the fact that the present more encouraging condition is a sufficient justification of the expense we have gone to to bring it about. The very wide prevalence of labor trouble all over the United States, and the severity and heavy expense under which the association labored in protecting the few of its shops that were struck, and the absolute clean cut victory which we have gained in absolutely every case, all go to show that the influence of our association is a deterrent to the other side of our particular controversy, and that there has been a very wholesome disposition on the part of the unions to let members of the National Metal Trades Association severely alone.

VIOLENCE AT STRIKES.

One curious fact that has come to the notice of your commissioner is that not one single strike during the last two years which was called by any local lodge of the International Association of Machinists, and which has been resisted by the employer, has been free from violence. I do not refer to mere picketing, but to absolute violence in the shape of assaults, and in some cases murder. If the wrecking crew, educational committee, missionary board or other euphoniously named gang of sluggers is not a fixed institution in that organization appearances are certainly very deceiving. It is only fair to say, however, that strikes in charge of certain officials, notably Messrs. Ames, Mulberry and Wilson, vice-presidents of the International Association of Machinists, are more violent than others.

While the officials of all unions publicly state that they do not approve of violence, it is unfortunate, to say the least, that they cannot control violence better than they do, and it is unfortunate that they print such things as was printed in the *Machinists' Journal*, where Vice-President Mulberry reported that "the climate of Cheyenne was not very productive to the health of scabs, as a number of them had been sent back home very ill;" and where Vice-President Wilson reported that in Omaha, where he had tab on the scabs day and night, the professionals were the only ones that would stay, "and you can do only one thing with them."

With the arousing of the public, violence in labor strikes is gradually becoming a thing of the past, and this is because of the enforcement of the law from the outside and not from any strong effort from outside the unions.

The men who really deprecate lawlessness leave the unions the first chance they get. This has been such a common occurrence that it is proverbial wherever the law is strictly enforced present day unionism has ceased from troubling and the weary are at rest.

WORK OF THE ADMINISTRATIVE COUNCIL.

Since our last convention in Buffalo the Council have held three meetings.

The first, held in Buffalo immediately after the convention, was called for the purpose of putting into effect immediately certain resolutions of the Buffalo convention, to provide for representation at the convention of the National Manufacturers' Association in New Orleans, and to take immediate steps toward handling certain labor difficulties that were then threatened and to provide for the appointment of a district organizer.

The Chicago meeting drew up certain rules for the conduct of the business of the administrative council; and also a set of recommendations to the membership, recommending the adoption as nearly as possible of a uniform apprenticeship agreement containing the rules and regulations covering the employment of apprentices.

The engagement of a deputy commissioner was also authorized, who was to act as a national organizer and supervisor of employment bureaus. It was also resolved that the efforts of our association and further organization be directed principally toward the securing of new members where local associations harmonious with our policy existed, and to the formation and strengthening of such local associations, and that our members be urged to join or form local associations.

A set of rules regulating employment departments were also drawn up at this meeting, prescribing the conditions under which the administrative council would approve the rebate voted by the last convention to such of our members as contributed to the support of such bureaus.

MODEL LOCAL AGREEMENT.

A draft of an agreement to be followed whenever possible by our membership in making local agreements was also adopted. Certain changes in the constitution were recommended, which were later submitted by ballot to the membership. A ruling was passed that where an applicant's plant include a department employing either structural iron workers, millwrights, carpenters and pipe fitters, which is virtually a unit separable from machine shops, that such men shall not come under the jurisdiction of our association. Certain districts were assigned each member of the administrative council to keep in touch with. Investigation by special committee was provided for in the case of the Kempsmith Machine Company, Milwaukee, Wis., and the W. P. Davis Machine Company of Rochester, N. Y.

The strike and lockout at Quincy, Ill., was considered, and defense of the strike approved and the lockout sanctioned.

It was ordered that a district meeting of chairmen and vice-chairmen be held at Cincinnati, to consider methods of fighting strikes, and the best courses of procedure to be followed in the same.

On October 19 and 20 the semiannual meeting of the council was held at Cincinnati.

NOT TO EXTEND WORK TO THE PACIFIC COAST.

The reports of the commissioner, secretary and treasurer were carefully considered, and reports of conditions existing in each district were received from each member of the council. The Pacific Coast Metal Trades' Association, having asked through its secretary whether we could take them in as a branch and put a deputy commissioner on the Coast to handle affairs out there, were advised that at the present time we could not take such action, and it was further decided for the present that we confine our efforts to the States east of and including Minnesota, Iowa, Missouri, Arkansas and Louisiana.

TO INCLUDE BRASS MOLDERS.

A number of our members having asked that their brass molders be included in the report of this association, as they were being organized into brass workers' unions which we were already covering in those shops, it was ruled that in such shops, where the brass molders were members of the Brass Workers' Union, that we assume jurisdiction, the president of the National Founders' Association having stated that they were not expecting to protect employers of such men.

One of the members having suggested that associate membership be created with reduced dues, the recommendation was not concurred in, and in view of the general depression in business it was resolved that our association resist any change from existing conditions which might tend to increase the members' running expense.

Propositions were submitted by a number of other trades organizations tending toward the establishment of relationships whereby their strike troubles could be handled through the National Metal Trades' Association, but at a reduced assessment from that of our present membership. The propositions were declined, and the gentlemen advised that we could only take them in on the regular basis, the same as our present membership.

The Finance Committee recommended that the employment bureaus of Detroit, Cincinnati, St. Louis and Worcester, being operated in accordance with our rules, entitled our members in those cities contributing to the bureau to a rebate.

CINCINNATI OFFICES COMPLIMENTED.

The accounts were audited and passed, and the secretary, treasurer and commissioner were complimented on the condition of office affairs. Various changes were suggested in the *Bulletin* by a special committee appointed for that purpose, which have been carried out.

A special committee having been appointed to look into the conduct of the business of the association in the closest detail, recommended that in view of the general depression in business, with prospects of further depression, that the expenses be reduced to a minimum amount compatible with efficiency, and that the expense of retaining the organizers in comparison with the results did not seem to justify that expense.

Article 8, Section 8 of the By-laws, demanding a clearer interpretation of the word "operative," was interpreted as meaning all employees engaged in the shops of our members included in the trades list, excepting iron foundry employees, engineers, firemen, shop and office clerks, stock keepers, general foremen, superintendents, drivers, draftsmen and yardmen.

Mr. Du Brul continues with exhaustive accounts of some 70 strikes which the association either settled favorably or forestalled for their members. In some of these cases mere mention of the fact that the concern involved was a member of the association proved effective in preventing the enforcement of demands of the union.

The resignations from the association of the following concerns were accepted during the year: Alfree Engine Company, Indianapolis, Ind.; Colorado Iron Works, Denver, Col.; Denver Engineering Works, Denver, Col.; F. M. Davis Iron Works, Denver, Col.; the Denver Iron Works & Foundry Company, the Dillon Iron Works Company, the Star Boiler & Sheet Iron Works, C. M. Anderson Forge & Tool Company, G. W. Livingston, Miller & Buchanan, J. H. Montgomery Machinery Company, Nock & Garside, Sack & Lawler Machine Mfg. Company, all of Denver, Col.; the National Cash Register Company; Columbia Engineering Works, Brooklyn, N. Y.; Pierson Machine Company, Chicago, Ill.; Filer & Stowell Company, Milwaukee, Wis.; Central Union Brass Company, St. Louis, Mo.; W. P. Davis Machine Company, Rochester, N. Y.; Gleason Tool Works, Rochester, N. Y.; John Inglis & Sons Company, Toronto, Canada; Watson Machine Company, Paterson, N. J.; Northern Machinery Company, Minneapolis, Minn.; Rahn Mayer Carpenter Company, Cincinnati, Ohio; Indianapolis Drop Forge Company, Indianapolis, Ind.; E. B. Hayes Machine Company, Oshkosh, Wis.; F. M. Prescott Steam Pump Company, Milwaukee, Wis.; Chicago Shipbuilding Company, Chicago, Ill.; the Stillwell, Bierce & Smith Vail Company, Dayton, Ohio; Hamilton Metal Pattern Company, Hamilton, Ohio.

The following concerns resigned their membership, but after reconsideration withdrew their resignations: Brown Cotton Gin Company, New London, Conn.; Carney & Trecker, Milwaukee, Wis.; Quintard Iron Works, New York.

The following concerns were dropped from the rolls for various reasons: E. E. Kendall & Son, Cambridge, Mass.; Samuel L. Moore & Sons Company, Elizabethport, N. J.; Stock & Haskins, Cincinnati, Ohio.

ACCRUED BENEFITS.

In reviewing the work of the year just closing one may say that our association has been comparatively free from serious troubles. There have been really only two or three cases in which we have been put to heavy expense, and with our growing experience in the matter of handling troubles there will probably be a gradual reduction in expense per case as time goes on.

During the last spring it was a very difficult matter to get men, as all nonunion men were busily employed, but as the summer wore on and as the present depression in business occurred it has become easier each week almost to fill strikers' places, and, besides, there have been fewer strikes. There is, of course, nothing quite so cooling to the ardor of the radical agitator as the knowledge that jobs are at a premium, and a further cooling effect is becoming apparent all over the country as the knowledge dawns on the hotheads that when they tangle up in a fight with this association they are in for a fight to the finish, and the finish has only been one way, and that is our way.

As a deterrent of trouble one can readily see that our association has been of great influence.

EXPENSES TO MEMBERS.

Reading over the report of trouble cases one may recognize at a glance the many of the cases reported were met in which no expense has devolved on the association, the case being handled for probationary members at their own expense.

One thing your commissioner wishes to impress upon the membership is as to the fallacy of the idea some of our members have as to what we do in the way of paying out money for breaking strikes. One cannot suppose for a moment that we can pay out more money than we take in and pay the expenses of running the association besides. It is the opinion of all members of the council and of all the members who have been in the association long enough to really understand its purposes that the moral influence and the other assistance resulting from membership in a body like this, outside of the mere payment of money, is worth incalculably more than what any member puts in.

To hear some manufacturers and even some members talk one would think that associations like ours are looked upon as "get-rich-quick" schemes, through which somebody threatened with a strike, on putting in \$1 or 50 cents, can have their troubles settled. While it is true that in a number of cases of strikes the member involved had expenses paid for him that far exceeded in amount what he has paid into the association, we must realize that we cannot do that very long or for very many members any more than the union could. While it is not impossible for us in some cases, it certainly is impossible in all. The point your commissioner desires to emphasize is that our membership thoroughly understands that the association will do the best it can for them, and that the association will do more for them than they can do for themselves; but neither this association nor any other can do impossibilities.

LOYALTY OF MEMBERS.

Your commissioner feels that the most valuable asset which our association has is the loyalty of its members one to the other, the united spirit they have in resisting aggressions and the knowledge that in standing by and maintaining our declaration of principles they are doing what all experience proves to be right.

Your commissioner is glad to note that the members of the association feel, individually and collectively, that this association and its success are to-day vital elements in their business; that the association is just as much a department of their business as their selling, advertising or manufacturing departments.

With the feeling among the membership, and with the realization that the members are the association and that the association is not a thing apart from its membership, and with the good condition financially in which we find ourselves, there is nothing that can prevent the association continuing its successful career.

Trade Publications.

Pumping Machinery for Beet Sugar Factories is the subject of a 65-page catalogue (K-104) from the Knowles Steam Pump Works, 114 Liberty street, New York City. In it are gathered in concise form all of the styles of pumping apparatus which are particularly adapted to use in the beet sugar industry. A valuable feature of the book is a classified table indicating the choice of apparatus which will best serve the various services encountered in a beet sugar plant, and following this each of the several types is taken up in order, with illustrations, text and tables of sizes and capacities.

A Reversing Countershaft.—The one-belt reversing countershaft manufactured by the Smith Countershaft Company of Melrose, Mass., is described in its catalogue D, just issued. It is a new mechanism designed to drive screw machines, monitors, engine lathes and other machine tools requiring a forward and reverse drive, and, as the name suggests, makes use of but one driving belt from the line shaft, the reversing being accomplished in the countershaft itself.

Nordberg Engines.—The D'Olier Engineering Company, 119 South Eleventh street, Philadelphia, Pa., in bulletin series G-No. 2 give an interesting explanation of the construction and application of the Nordberg engines. On the cover is illustrated what is said to be the most powerful mine hoist ever constructed. It has a capacity of 5000 indicated horse-power and was installed for the Tamarack Mining Company, Calumet, Mich.

Pneumatic Tools.—The 1904 catalogue of the Consolidated Pneumatic Tool Company, Limited, 9 Bridge street, Westminster, London, S. W., England, supersedes all those previously issued by the New Taite Howard and the International Pneumatic Tool companies, both of which have been absorbed by the Consolidated Company. The catalogue contains 126 pages, carefully indexed, and is divided into four parts. The first illustrates various forms of hammers, riveters, drills, tube cutters, machinery grinders, polishers, jacks, holsts, forges, &c. Following the list of apparatus with its illustrations, more complete directions and descriptions are given of each of the several types. Similarly another part takes up the list of repair parts, giving the numbers and names to order by. The last part is a supplement illustrating applications. The firm direct attention to some slight alterations in the cable code which will hereafter be in effect.

Alternators.—The National Electric Company, Milwaukee, Wis., have brought out catalogue No. 60 on alternating current machinery for lighting, power and railway service. It is a very complete book, 40 pages in length, giving a general and detailed description of the apparatus and dimensions, diagrams and tables. It is handsomely illustrated and will be found of interest to those concerned with the growing importance of alternating current machinery in power service.

Milling Machines.—The latest design of milling machines manufactured by the Oesterlein Machine Company, Cincinnati, Ohio, is presented in catalogue A, just received. There are three sizes of plain and the same number of universal milling machines shown, with one special plain milling machine having an extra long traverse feed, with automatic feeds in all directions. Among the special accessories illustrated are a vertical spindle milling attachment, a circular milling attachment, three forms of vise, a center rest, arbors and a universal cutter and tool grinder.

Steam Specialties.—Warren Webster & Co., Camden, N. J., have systematized the compilation and distribution of trade literature, new publications now being issued in the form of loose sections which may be added to their predecessors or substituted for those they supersede. The matter now included under the preceding subject is in five parts: The first concerns the Webster Star vacuum feed water heaters and purifiers, and gives a fund of information on feed water heating. Appendix 1 to part 1 illustrates the standard pattern class A; appendix 2, class C, capacities 500 horse-power and larger; appendix 3, a collection of testimonial letters; appendix 5, class C, capacities 50 to 500 horse-power. The following are the subjects of the other parts: Part 2, apparatus for purifying feed water when requiring chemical treatment; part 3, Webster separators for steam and oil; part 4, Webster live steam purifiers, and part 5, the Webster system of steam circulation for heating purposes at or below the pressure of the atmosphere. The last 35 pages of part 5 contain beautiful engravings of various notable buildings in which the Webster system has been installed. Appendix 1 of part 5 describes the Webster motor valve for use in connection with the low pressure circulation of steam for heating purposes.

Portable Grinders and Drills.—A number of specialties manufactured by the Hisey-Wolf Machine Company, Cincinnati, Ohio, are described in a booklet having the foregoing title. It includes a general description of the Hisey portable electrically driven grinder and illustrations of its application in grinding lathe centers, milling machine cutters, and its use on a lathe for internal grinding and on a planer for surface grinding; the Hisey portable bench grinder; a portable suspended surface grinder; an electric hand or breast drill; a special reaming and tapping machine; a Scotch drill, and a portable electric radial drill.

Power Presses.—Inclinable open back power presses, manufactured by the V. & O. Press Company, formerly Viellard & Oswald, Brooklyn, N. Y., are described in their catalogue No. 10. A peculiarity of the machine is the provision for ripping it back bodily to facilitate the inserting of work. It is made in seven sizes, ranging in weight from 500 to 5500 pounds, and

is designed for such work as cutting, forming, punching, pressing, shallow drawing, &c., all kinds of sheet metal goods, pasteboards, celluloids, leather and other sheet materials. Each size is illustrated in both its upright and inclined positions, with a brief note appended drawing attention to the work to which it is particularly adapted. The press is also shown equipped with a dial feed and positive safety clutch attachment, which prevents the slide from descending far enough to cause any damage in case the dial should fail to assume its correct position.

Conveying Machinery.—The Borden & Selleck Company, 48 Lake street, Chicago, Ill., manufacture machinery for handling freight or merchandise of all kinds and material in bulk, such as coal, crushed stone, &c., transferring it horizontally, vertically or on an incline. In a recent booklet, No. 6, several very interesting installations are illustrated profusely. The text is balled down in a manner that will appeal to the busy man, and depends principally upon the pictures to tell the story. Among the more notable equipments are a freight conveyor for the Minneapolis, St. Paul & Salt Ste. Marie Railway, Gladstone, Mich., and a coal conveyor in the Chicago Consolidated Traction Company's power house.

Dynamos and Motors.—Bulletin No. 149 from the C. & C. Electric Company, 143 Liberty street, New York City, deals with type M. P. multipolar dynamos and motors for direct current. The design and construction of the machine are taken up in detail, tables of capacities and dimensions are given and numerous illustrations of the various forms and typical installations.

Electrical Apparatus.—Five new bulletins have been received from the Holtzer-Cabot Electric Company, Boston (Brookline), Mass. No. 112-A pertains to telephone desk sets, these being in two forms, the ordinary pedestal pattern and one of swinging arm form, and a word is added upon the Ness automatic wall and desk sets for local interior systems. No. 123-A is on the subject of transmitter arms, telephone cords and induction coils. No. 125-A is on gravity hook switches, and No. 127-A on testing magnetos and portable testing sets. Bulletin No. 300 contains 12 pages, giving a complete description of the type M dynamos and motors and their component parts.

Machine Tools for Working Plate Bars and Structural Shapes is the title of catalogue K from the Hilles & Jones Company, Wilmington, Del. It is practically an album of engravings depicting various styles of punches and coping machines, shears, beveling and clipping machines, straightening and bending presses and plate bending machines. A brief reference in text accompanies each illustration. Two of the more remarkable machines shown are a heavy multiple punch and plate shear, capable of punching at one stroke 45 holes 11-16 inches in diameter through 3/4-inch plate, and a heavy plate shear with a capacity for shearing 1 1/2-inch plate 12 feet wide at one stroke.

Cement.—The Lehigh Portland Cement Company, Allentown, Pa., have issued a new catalogue on their product. The book is profuse with views of the six mills operated by the company, the combined capacity of which is 11,000 barrels daily, and is further enlivened by numerous illustrations of buildings and other engineering works in which the Lehigh cement has been used. Numerous letters of recommendation are included, with a record of Government tests made at Tybee Island, Ga., under the direction of Capt. Cassius E. Gillette. The cement when combined one part to three of sand gave an average test of 355 pounds tensile strength after one day in air and 27 days in water.

NOTES.

The Herron & Burr Mfg. Company, Erie, Pa., are mailing an advertising postal card which emphasizes the serviceability of pneumatic appliances in the working of marble and granite, and reminds the reader of their line of air compressors for steam, belt or motor drive.

The National Oil Burner Equipment Company, Holland Building, St. Louis, Mo., have issued two new circulars. One known as "Steam Bulletin No. 10," deals with steam traps, steam separators, back pressure valves, the American air compressor, and the Klinger water glass. The other is a leaflet on the Jefferson patent flange union, one which requires no packing.

The Railway & Electric Equipment Company, Real Estate Trust Building, Philadelphia, Pa., are distributing a list of second-hand machinery and other apparatus. It is divided into two parts, the first covering electrical machinery, trolley roads and lighting, and the second railway equipment, steam roads and miscellaneous apparatus.

The Buffalo Forge Company, Buffalo, N. Y., have issued a little pamphlet on the Buffalo B volume blowers and exhausters. These are furnished in a large range of sizes and forms of discharge, hence are adapted to an extensive variety of uses.

The American Air Compressor Works, 26 Cortlandt street, New York City, are issuing a little booklet as a forerunner of a new and complete catalogue on the American air and gas compressors, air receivers, vacuum pumps, compressed air tools and various appliances. The booklet itself contains considerable interesting matter regarding compressed air installations.

The Crosby Steam Gage & Valve Company, 78 John street, New York, have issued a circular containing in condensed form matter relating to their various specialties, including all kinds of gauges, valves and the Crosby indicator, gauge tester and revolution counter.

Trow & Holden, manufacturers of high grade granite tools at Barre, Vt., have issued an attractive catalogue showing their complete line of this class of tools, including plain and bush

hammers of the company's own patent, bush and cross chisels, boxing tongs, improved straight edge, granite wedges and shims, points and chisels, plug drills, chippers and handsets, steel chain hooks, grab links, heavy wire rope sockets, stone lewis, steel lifting hooks, granite tool tongs, and air hose and nipples. In addition the catalogue contains interesting and valuable tables showing the weight and strength of chain and the average weight of steel per lineal foot.

The Wagner-Palmros Mfg. Company, Fairmont, W. Va., are distributing a circular letter with inclosed flyers pertaining to a cast iron chilled track roller and a chilled curve sheave and stand.

The Edgecombe Company, Lock Box 483, Indianapolis, Ind., have issued three flyers on the subject of their Red Cross pipe joint cement. One describes the latter, another is a price-list, and the third gives a special trial offer.

The H. W. Johns-Manville Company, 100 William street, New York City, describes "Cellinite," a new fire proofing material made of specially prepared asbestos, in a leaflet which is now being distributed.

The Standard Pressed Steel Company, Twentieth and Clearfield streets, Philadelphia, Pa., describe the American Pioneer pressed steel shaft hanger in a small booklet of 18 pages. An illustrated description of this hanger was given in *The Iron Age* of March 3.

The Spicer Mfg. Company, South Broadway, New Philadelphia, Ohio, in a 12-page brochure describe a wire nail cleaner barrel, a steel chain nail cleaner barrel, an adjustable wire reel, a sawdust separator, and three forms of metal trucks.

The New Jersey Foundry & Machine Company, 9-15 Murray street, New York City, are distributing a neat souvenir in the form of a leather cornered desk pad with memorandum sheets about $3\frac{1}{2} \times 5$ inches in size.

In a three-fold cardboard circular, the Stromberg-Carlson Telephone Mfg. Company, Rochester, N. Y., describe their various lines of goods, prominent among which are aerial lead covered telephone cables, switchboard cables, cords, annunciator

MANUFACTURING.

Iron and Steel.

Spang, Chalfant & Co., Incorporated, Pittsburgh, operating the Etna Iron & Tube Works, advise us that the report that they are about to make extensive additions and improvements to their plant is untrue. They are not contemplating any extensive improvements at the present time.

At the annual meeting of the Temple Iron Company, held at Reading, Pa., these officers were elected: President, Geo. F. Baer; vice-president, Archibald F. Law of Scranton. Directors: W. H. Truesdale, president of the Delaware, Lackawanna & Western Railroad; F. E. Underwood, president of the Erie Railway Company; Thos. Fowler, president of the New York, Ontario & Western Railroad; I. A. Stearns, J. R. Maxwell, E. B. Thomas, president of the Lehigh Valley Railroad; Albert Broden, superintendent of the Reading Iron Company furnaces, and Geo. S. Harris, ex-president of the Reading Railway Company.

On the application of Charles A. Moore of Manning, Maxwell & Moore, New York, Colby M. Chester, Jr., has been appointed receiver for the Astoria Steel Company, Astoria, L. I. The plant was formerly operated by the New York Steel & Wire Company and was taken over last spring by the Astoria Steel Company, who equipped it for the manufacture of steel castings, making extensive additions to the buildings. The company have outstanding debenture bonds to the amount of \$225,000, and there is a mortgage of \$150,000 on the real estate. The unsecured liabilities are reported to be \$80,000. It is thought that the suspension will be temporary and that the creditors will be paid in full.

The rail mill of the Pennsylvania Steel Company, Steelton, Pa., resumed work on Monday, March 21, with good prospects of steady work. Electric rollers are being constructed for the handling of rails from the drillers to the shipping yard. The steel company's loss in the recent Susquehanna River flood amounted to about \$50,000. Most of the mills were under water.

The Bethlehem Steel Company, Bethlehem, Pa., have shipped during the past few days nearly 900 tons of finished side armor to the shipyards at Bath, Maine, and Newport News for the battle ships "Georgia" and "Louisiana," which are being built at those places. The armor varied from 4 to 9 inches in thickness and occupied 32 cars.

For the first time in six months the American tin plate factory at Elwood, Ind., is in full operation, repairs having been completed.

The Alan Wood Company's mills in Conshohocken, Pa., are enjoying record breaking business, operating with three shifts of men eight hours each.

The Standard Bolt & Mfg. Company, Alliance, Ohio, advise us that they have been considering the matter of erecting a plant at Norfolk, Va., but no definite action has been taken and the matter has been dropped for the present.

Atlantic Furnace of the Republic Iron & Steel Company, at New Castle, Pa., was put in blast last week. It had been idle about six months.

It is officially denied that the Republic Iron & Steel Company will purchase the Haselton plant of the American Bridge Company, at Haselton, Ohio.

Spearman Furnace of the Spearman Iron Company, at Sharpville, Pa., was put in blast on Friday, March 18, after being idle for some months.

General Machinery.

The Standard Machine Works, Gilsburg, Ohio, have been organized to build special machinery and to do a general jobbing business. Edward Williams is manager.

The Anti-Friction Journal Box Company, Los Angeles, Cal., have been incorporated with a capital stock of \$1,000,000 to manufacture a patent journal box for vehicles and machinery. The incorporators are Delos Allen, Jonathan M. Green and David E. Lyons of Los Angeles.

The Economy Silo & Tank Company, Frederick, Md., are in the market for machinery for the manufacture of tubs, buckets, handles, &c.

The Stanyon Engineering Company, Empire Building, Pittsburgh, Pa., are in the market for a second-hand wire fence machine for making square mesh field fencing.

The Chicago, Milwaukee & St. Paul Railroad Company will build a new \$30,000 round house near their West Milwaukee shops, in Milwaukee, Wis. The new structure will accommodate 24 locomotives.

The Ocala Foundry & Machine Works, Ocala, Fla., were commenced and incorporated under the State laws of Florida in July, 1890. The president and treasurer is N. W. Harrison; secretary, Charles E. Thomas, and general manager, D. L. Anderson. They manufacture sawmills and phosphate machinery and also handle a general stock of mill supplies, engines, boilers, &c.

The Pittsburgh *Gazette*, Pittsburgh, Pa., is considering the installation of newspaper conveying machinery in its plant.

Harvey V. Richards has been appointed receiver for the Automatic Gas Machine Company, New Haven, Conn. The company are capitalized at \$50,000.

The Tilghman-Brooksbank Sand Blast Company, 409 Commerce street, Philadelphia, Pa., recently incorporated with a capital stock of \$100,000, have been appointed by B. C. & R. A. Tilghman sole agents for the sale of all sand blast machinery and supplies manufactured by them under the Tilghman and Matthewson patents. The officers are B. C. Tilghman, president; R. Tilghman, vice-president; C. B. Brooksbank, secretary and treasurer; F. C. Brooksbank, formerly with E. T. Ward & Sons, Boston, general manager.

The American Engineering & Reduction Company, Cleveland, Ohio, have opened offices at 726, 727 Caxton Building. This company were mentioned heretofore in these columns as preparing to manufacture and market the Lane pneumatic centrifugal separator and concentrator for mining. C. H. Lane, inventor of the device and vice-president of the company, is now in Mexico inspecting two mines at which it is intended to use the machine.

Power Plant Equipment.

The Chicago City Railway Company, Chicago, contemplate the erection of a great central electric power plant at West Thirty-eighth and Halsted streets, to cost \$4,000,000, the purpose being to operate all the trolley lines belonging to that company from the one central power station. They state, however, that they will not begin construction of the plant until certain disputes with the city as to franchise are settled.

The Camp Engineering Company, rebuilders and sellers of second-hand steam engines, Chicago, state that their business for the last three weeks was greater in volume than for the total six months preceding, and that the supply of such second-hand equipment is likely to be less than the demand. The sudden awakening in demand for second-hand engines is thought to be due to the fact that the severity of the weather made it impossible to lay foundations and also to the feeling of uncertainty which has been present in manufacturing lines. The greatest demand for rebuilt engines seems to be from manufacturing and electric lighting plants.

The National Electric Company, successors to the Christensen Engineering Company, Milwaukee, will exhibit their electrical and air brake apparatus at the St. Louis Fair. Part of their electrical exhibit will include a 1500-kw. alternating current generator, which will be in operation at the central power station, furnishing power for various purposes. In addition a number of smaller alternating and direct current machines will be exhibited at their space, including a very complete exhibit of the Christensen air brake equipment, so well known in the street railway field.

The Stamford Iron Works, Stamford, Conn., boiler makers and blacksmiths, are building a new boiler and forge shop, 30 x 50 feet, two stories, with a wing 25 x 40 feet, for general repair work.

B. F. Burk and G. A. Shideler, well-known manufacturers of

Marion, Ind., are contemplating the erection of an electric power plant in Asheville, N. C., to be operated by water power.

The Hoosac Mountain Electric Power Company are about to develop water power at Readsboro, Vt., for electric purposes.

As the result of a recent disastrous fire the village of Conneaut, Ohio, is in the market for a new steam fire engine.

Harvey C. Hubbell, Charles C. Hubbell and John W. Hawks of Mount Vernon, Ohio, have obtained a franchise in that city for an electric lighting and steam heating system. They are having plans prepared for a plant and will probably secure the contract for city lighting.

Foundries.

The Harmony Grove Foundry, at Commerce, Ga., has been sold to W. A. Gibbs, who will operate the plant. The foundry is well equipped and the only equipment that Mr. Gibbs will buy is a second-hand 24-inch lathe and a new 6 or 8 horse-power gasoline engine.

The plant of the Simpson Stove & Mfg. Company, at Canonsburg, Pa., which recently went into the hands of receivers, has been put in operation again.

The Peru Steel Castings Company, Peru, Ind., closed down on March 12, with the probability that they would reopen April 1, with the starting of the building season. Eighteen months ago they were one of the busiest plants in the country, with day and night shifts of 300 men, but work gradually decreased with the decline in building operations.

Receiver James Israel of the Coxey Steel Casting Works at Mount Vernon, Ohio, has received an order from the court to cease operating. The plant and business will be sold in the near future and a number of prospective purchasers have made propositions. The works were built by General J. S. Coxey about two years ago.

Bridges and Buildings.

The Chicago Bridge & Iron Company, Chicago, have secured the contract for the construction of a steel tank at Jefferson Barracks, Mo. The contract price is \$12,900.

Fires.

R. J. Horner & Co.'s furniture factory, on West Twenty-fourth street, New York, was destroyed by fire March 19. The loss is estimated at \$50,000.

One of the buildings of the Cottle Leather Company, Woburn, Mass., was destroyed by fire on March 16, causing a loss of \$30,000.

One of the mills of the Fitchburg Paper Company, Fitchburg, Mass., was burned on March 18, the loss being \$50,000.

The Imperial Expanded Metal Company and the T. L. Knudtson Machinery Mfg. Company, Chicago, suffered a total loss of their plants in a fire March 15 as a result of the explosion of percussion caps in the plant of the Chicago Toy & Novelty Company, who occupied the same building.

The plants of the Bayway Refining Company and the Pennsylvania & Delaware Oil Company were destroyed by fire March 19. The loss is placed at \$100,000.

John Thompson & Sons' gas engine shops in South Beloit, Wis., were destroyed by fire March 21. The loss is placed at \$60,000.

Hardware.

The Cold-Jess Mfg. Company, Cleveland, Ohio, have been formed by several gentlemen who were formerly with the Kirk-Latty Mfg. Company of that city, and they are preparing to erect a shop, 50 x 100 feet, on West Madison avenue, Cleveland, where they will manufacture carriage bolts and nuts and other specialties.

The Republic Rubber Company, Youngstown, Ohio, advise us that they have secured a contract for nearly 50,000 feet of their White Shield brand of fire hose from the authorities of the City of New York. The company state that the required specifications were unusually rigid and exacting.

The Waddell Wooden Ware Works Company, Greenfield, Ohio, are quite busy, principally on their contract with the Post Office Department for routing tables and distributing cases for the free and rural delivery service throughout the country. They are also manufacturers of store furniture, showcases, vending machines, coffee mills, money drawers, &c.

The Simonetta File Company, Detroit, Mich., have been organized with a capital stock of \$25,000, and have elected the following officers and directors: Rodolfo Simonetta, president and general manager; Charles F. Berry, vice-president; Eugene C. Whitney, secretary and treasurer; Henry J. Boerth, D. Z. Curtiss. They will engage in the manufacturing of files and rasps and the tempering of tools. The company advise us that their files will be made of the best English steel, the tempering being done by the Simonetta secret process, which, it is stated, has been used by the Simonetta family in Italy since 1849. The factory is located at 192-196 High street, West, and will be ready by March 15.

In line with the increasing demand for White Lily washers the White Lily Washer Company, Davenport, Iowa, are making improvements to their factory, which will provide much enlarged facilities in the way of floor space. An addition to the

wood working department, 14 x 100 feet, is under way, and they are also erecting a new building, 40 x 175 feet. The company have doubled their capital stock, the added amount being subscribed for and fully paid in by the present stockholders.

The Excelsior Steel Furnace Company, Chicago, have leased from Montgomery, Ward & Co. a large warehouse building on Clinton street, near Monroe, which will be utilized for the storage of stove pipe and elbows. The structure is four stories and basement high, and with the present quarters of the company will give them nearly 200,000 feet of floor space.

R. H. Dorsey of Oklahoma City, O. T., has purchased the Gainesville Iron Works, Gainesville, Tex., from the heirs of the late G. B. Rogers. The Gainesville works manufacture store fronts, sash weights, stove grates, &c.

The Marion Handle & Mfg. Company, Marion, Ind., are the successors to the Marion Handle Company, the new company, with \$125,000 capital, purchasing the former company's plant and other interests.

The Bridgeport Brass Company, Bridgeport, Conn., will erect a large addition to their plant this season, to increase their manufacturing facilities. The new building will be of brick, 32 x 200 feet on the ground, and four stories.

The Board of Trade of Bellevue, Ohio, has submitted a proposition to the Townsend Mfg. Company, Trenton, N. J., manufacturers of lawn mowers, who are seeking a location in Northern Ohio.

Miscellaneous.

Schwarzschild & Sulzberger, Union Stock Yards, Chicago, will build a cold storage warehouse with about 30,000,000 pounds capacity. The building will be eight stories high, 108 x 175 feet, of brick and heavy mill construction, and will cost \$150,000. The company will require cast iron, steel beams, &c.; also 14-inch pipe for cooling, iron stairways, elevators, motors, iron tanks, iron doors, &c.

The Reliance Automobile Company have been incorporated at Detroit, Mich., with a capital stock of \$150,000. The officers of the company are: D. O. Paige, president and manager; Hugh O'Connor, vice-president; J. M. Mulkey, secretary-treasurer; E. O. Abbot, superintendent.

The Flemming Tank Company, Pittsburgh, have received an order for two cypress tanks, to be used in connection with water softening plants. One will be 70 feet long by 10 feet high, by 10 feet wide, and the other will be 40 x 10 x 10 feet. Among recent orders filled by the company are a 50,000-gallon tank for Dorothy coke works of the H. C. Frick Coke Company; a 19 x 10 x 7 foot and a 16 x 10 foot for the Dalton Water Works, Dalton, Ga., to be used in connection with the Scalfe system of water softening; 25,000-gallon tank for the Ward-Mackey Company, Pittsburgh; a 25,000-gallon tank for Kaufmann Brothers, Pittsburgh, a duplicate of one recently installed; a 30,000-gallon tank for the Nernst Lamp Company; one of 10,000 gallons capacity for M. H. Pickering; Black & Barker, 1000 gallons; Duff Building, one of 6000 and one of 15,000 gallons capacity; Best Mfg. Company, 30,000-gallon for the foundry and 10,000-gallon for the main works, and two large tanks for the Garland Nut & Rivet Company, for acids.

J. A. Stewart, civil engineer, Cincinnati, Ohio, will receive bids on April 9 for the construction of a water works system in the village of Kennedy Heights, Hamilton County, Ohio. There will be 15,000 lineal feet of 4-inch pipe laid and one water tower constructed of either wood, steel or concrete.

The Merrill-Stevens Company, Jacksonville, Fla., organized early in the year with a capital stock of \$500,000, have taken over the business and plant of the Merrill-Stevens Engineering Company, who have conducted a successful shipbuilding and machinery business for a number of years. The change was made in order to obtain increased capital and facilities for handling their business. The new company have enlarged the plant and installed important and expensive machinery. A large floating dry dock has also been constructed. When all improvements are completed the company will have the largest and most completely equipped plant south of Newport News. The company continue under the same management, which is in the hands of A. D. Stevens, J. E. Merrill and A. R. Merrill.

The Petersburg Galvanized Iron Works, Petersburg, Ind., have been incorporated with \$10,000 capital, by George N. Bohnert, Wm. E. Williams and John H. Klehe.

The Inland Novelty Iron Works have been incorporated at Indianapolis with \$5000 capital. Directors: Chas. A. Bookwalter, D. V. Reedy and Harry P. Brumbaugh.

A. Buch's Sons, Elizabethtown, Pa., manufacturers of farm machinery, have incorporated as the A. Buch's Sons Company. No change in management is contemplated.

The Ayer & Lord Barge Company, Evansville, Ind., have been incorporated with \$50,000 capital stock, to build steamers, barges, &c. Directors: Edwin E. Ayers, John B. Lord, A. A. Carpenter, R. R. Smith and P. H. Johnson.

The Haskell & Barker Car Company have petitioned the Council of Michigan City, Ind., for the vacation of part of a street which they need for the site of an addition to their plant. In the proposed new mill they will manufacture steel sills for cars, which, the company say, are taking the place of wooden sills.

The street is included in a half block of residence property the company have purchased for the extension of their plant.

The Lake Shore Electric Railway Company, Cleveland, Ohio, have placed a contract with the Aermotor Company, Chicago, for two structural steel towers to be used in carrying high tension transmission lines over Black River, a navigable stream near Lorain, Ohio.

The Hoover Wagon Company, York, Pa., will rebuild their plant, which was recently destroyed by fire, on a larger and more modern scale. The plans for the buildings have not yet been completed.

The New Jersey Tube Company, Newark, N. J., have purchased 7 acres of land on the Erie Railroad, in Harrison, upon which they are erecting a seamless brass and copper tube plant.

Robert Wetherill & Co., Chester, Pa., have just received a contract for eight large filters for the Rochester & Lake Ontario Water Company, and expect to have the work completed in a month or six weeks. Each filter will have a capacity of 600,000 gallons per day. The firm have just finished eight filters of a similar make for the water company at Sayre. Each of these filters has a capacity of 500,000 gallons per day.

A contract has just been closed by the Great Lakes Towing Company with the American Shipbuilding Company for the construction of a floating dry dock 76 feet long, 43 feet beam and 6 feet deep. It will be stationed at Fairport, and all tugs of the company will be sent there for repairs. The dock will be built at Cleveland and will be finished in two months.

American Bridge Company Changes.

The American Bridge Company have abolished their Eastern and Pittsburgh divisions and the plants now embraced in them have been put in charge of R. J. Davis as operating manager, with headquarters in the Frick Building, Pittsburgh, Pa. President Alfred J. Major of the American Bridge Company announces the removal of the general offices of that company from Philadelphia to Frick Building, Pittsburgh, as follows: March 26, president, assistant to president and operating manager; March 31, auditing department; April 9, treasury department.

President Joshua A. Hatfield of the American Bridge Company of New York also announces the removal of the offices of that company from Philadelphia to Frick Building, Pittsburgh, as follows: March 26, chief engineer; March 31, auditing department; April 9, treasury department. The offices of the president and secretary will remain at 100 Broadway, New York.

Stack No. 5 of the Eliza group of furnaces of the Jones & Laughlin Steel Company of Pittsburgh is ready for blast and will likely be put in operation within a short time. This furnace is 21 x 85 feet, being somewhat smaller than the other four Eliza furnaces comprising this group. It is probable that later on the Jones & Laughlin Company will build a sixth Eliza stack, but nothing definite in this direction has been done. The report that the Jones & Laughlin Steel Company had abandoned their intention of establishing ore docks at Geneva Harbor, about 9 miles from Ashtabula, Ohio, is incorrect. Those company own a very large lot of ground at Geneva Harbor, and at some time it will be utilized for the purpose for which it was originally intended.

James Roberts of the Indiana State Factory Inspection Bureau, who has completed a tour of the northern part of the State, says he has never seen greater activity in the factories or more of them in course of construction. The new factories, he says, are all being equipped in harmony with the State laws for the protection of the lives of factory employees.

The Pittsburgh Pipe & Iron Company, on account of increased business, have removed to their new plant at McKee's Rocks, Pittsburgh. They are in position to furnish all sizes of second-hand pipe, boiler tubes, cut to lengths, buck staves, and will handle a full line of scrap and metals.

Representatives of 18 different bridge manufacturing concerns came together at Bucyrus, Ohio, a few days ago to compete for a bridge over the Sandusky River. The bids ranged from \$2100 to \$3000. The activity of competition over so small an order is noteworthy.

Third Trip Through the Hudson River Tunnel.

On Tuesday last Charles M. Jacobs, chief engineer for the New York & Jersey Railroad Company, in the construction of their Hudson River tunnel, conducted a third party of outsiders through the recently completed north tube. There were some 24 persons in number, mostly members of the faculty and student body of Columbia University in the civil and mining engineering departments, at whose request the trip was organized. The passage was made from the Jersey City side to New York without mishap of any sort, and apparently no one was materially discomforted, though a long stretch was made under a pressure of 21 pounds. The continued use of the compressed air is occasioned by the fact that all of the leaks and connections are not absolutely tight as yet, but the work is progressing in a thoroughly satisfactory manner, and Mr. Jacobs gives it as his opinion that another month or two at the most will see the north tube finished with the constructional apparatus, shields, air locks, &c., removed and normal pressure restored. It will probably be a year or more, however, before any cars are running.

The history of this tunnel is familiar to all from the extended discussion which it has received in both the technical and news press during the last fortnight or so and even earlier. The discouragements were many, and that the task has at last been successfully accomplished is cause for justifiable pride on the part of all concerned, promoters and engineers. One very interesting engineering ruse, which was used at the time a few months ago when a ledge of rock was encountered, is not generally known. It was original with Mr. Jacobs and was described to the party. When it was found that the shield could not be advanced on account of the rock sufficiently to insert the next ring of the permanent tube it was at once realized that hasty measures must be taken to prevent the soft silt from caving in during the time necessary to drill and blast the rock into pieces small enough to pass through the openings in the shield. The air pressure alone could not effect this over so large a surface, and could not be increased without danger of blowing through the mud, causing loss of pressure and inrush of the water, so a good grade of clay was procured and spread about the opening and baked by torches until it was formed into a substantial brick lining. This was accomplished in eight hours, whereas had the freezing method been employed it would have required a number of days. With this protection the integrity of the exposed wall at the breach of the tunnel was preserved until the obstacles in the way of the shield's advance had been removed.

The Donora Furnaces to Start.—The two blast furnaces of the Carnegie Steel Company at Donora, Pa., are nearly completed, and No. 1 is to be blown in on Tuesday, April 5, and the other stack the first week in May. These two furnaces are expected to turn out about 500 tons of iron per day each. The open-hearth steel plant, which is in charge of Nevin McConnell, contains twelve 50-ton furnaces and is nearly completed. At least a part of the open-hearth plant may be started shortly after the first blast furnace is put in operation. The output of the open-hearth plant will be used in the rod and wire mills at Donora. The building of these blast furnaces and open-hearth plant was originally started by the Union Steel Company, but when that concern was absorbed by the United States Steel Corporation the plant was turned over to the Carnegie Steel Company, who then took charge of the constructing work.

The Indianapolis pattern makers have settled their wage scale with the foundrymen for another year. Those who were drawing 37½ cents an hour will receive the same; those heretofore receiving 35 cents will get an advance of 1 cent an hour. There is no adjustment yet of the long standing differences with the molders, the national conference over which at Indianapolis recently bore no results.

The Iron and Metal Trades

On the whole the better feeling in the Iron trade has gained. The total tonnage has improved, and the prospect for the near future indicates further accessions to orders.

In the Foundry Iron trade a slight halt is noted, many buyers declining to meet the higher prices demanded by the furnacemen, with indications that they occasionally succeed in finding a seller who is not yet quite in line. It is becoming more apparent day by day that the amount of tonnage placed during the rising market was very large in the aggregate. Lately there has been quite a good deal of Forge Iron sold, at advancing prices, and puddling mills have taken some very good orders.

In Chicago a peculiar state of affairs has developed in freight rates on Southern Pig Iron, there having been a cut from \$3.85 to \$3.50 in the rate from Birmingham to Chicago. The old rate is, however, to be restored at an early date.

Militating against an upward tendency of the Pig Iron market is the disappearance of any danger of troubles in the bituminous coal mines, and the probability of lower prices on lake Ores. Even now Ores are being offered to merchant furnaces making Foundry Iron at a concession of 50c. per ton under last season's contract figures.

The market for Bessemer Pig Iron in the Central West is moderately actively and decidedly firm. It is understood that the United States Steel Corporation are running 87 per cent. of their furnace capacity, are blowing in several of their furnaces still idle, and are urging delivery in the Iron purchased from outside interests. The consumption for Steel manufacture is therefore decidedly heavy.

Quite a number of fair sized contracts for Structural Material for buildings in different parts of the country have been placed during the past week, and a good deal of tonnage is on the eve of being placed. This is aside from any Baltimore work, which is slow in coming out. The demand for bridge work is, however, light.

There is a little better feeling in the Plate market. The leading locomotive works have secured at least one very good order, and another of nearly like size is coming out from the same quarters. Car work is dragging because it is difficult to finance Car Trust Certificates at the present time.

The Bar trade has been active, East and West, and some good contracts have been taken. The heavy tonnage placed in anticipation of the last advance seems to have encouraged the talk of a further lifting of the price by \$1 per ton. Hoops have been slightly advanced.

The acceptance of a temporary reduction of wages of 20 per cent. on the part of the Sheet mill and Tin Plate workers, has given rise to the apprehension that a slight lowering in selling prices, notably in Sheets, may follow.

The markets for Scrap and Old Material have shown an animation bordering on excitement. Prices, notably on Old Steel Rails, have gone up, and there is an active demand for Forging and for Melting Scrap.

Advices from abroad indicate a somewhat firmer feeling. In England Steel Billets are now quoted by American and German sellers at 80 shillings, c.i.f. English ports, against the low record of 75 shillings some time since. This is due to the fact that the United States Steel Corporation are more and more seeking to place their export tonnage in the form of finished product rather than of semicrude, and that this interest has little Steel to spare during the first half of the year, owing to the home requirements of the constituent companies.

There are few sellers in England of German Steel because the organization of the new Steel Syndicate is not yet perfected, and pending that Steel is being offered only by second hands.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Mar.23, Mar.16, Feb.24, Mar.25,
1904. 1904. 1904. 1903.

PIG IRON:

Foundry Pig No. 2, Standard, Philadelphia	\$15.00	\$14.75	\$14.50	\$22.25
Foundry Pig No. 2, Southern, Cincinnati	12.50	12.25	11.75	21.25
Foundry Pig No. 2, Local, Chicago	14.00	14.00	13.00	22.50
Bessemer Pig, Pittsburgh	14.10	14.10	13.60	21.85
Gray Forge, Pittsburgh	13.35	13.25	12.75	21.00
Lake Superior Charcoal, Chicago	14.75	14.75	15.75	26.50

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh	23.00	23.00	23.00	31.00
Steel Billets, Philadelphia	25.00	24.50	24.00	29.00
Steel Billets, Chicago	24.00	24.00	24.00	31.50
Wire Rods, Pittsburgh	31.00	31.00	30.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	11.50	12.50	11.50	18.50
O. Steel Rails, Philadelphia	15.00	14.00	13.50	21.25
O. Iron Rails, Chicago	16.50	16.50	17.00	24.00
O. Iron Rails, Philadelphia	18.00	17.00	15.00	24.50
O. Car Wheels, Chicago	14.50	14.50	14.50	24.00
O. Car Wheels, Philadelphia	13.50	13.00	13.00	24.50
Heavy Steel Scrap, Pittsburgh	14.00	14.00	13.75	21.50
Heavy Steel Scrap, Chicago	11.50	11.50	11.50	18.25

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.48½	1.43½	1.40	1.93½
Common Iron Bars, Chicago	1.50	1.50	1.40	1.80
Common Iron Bars, Pittsburgh	1.40	1.34½	1.34½	1.89½
Steel Bars, Tidewater	1.49½	1.49½	1.44½	1.75
Steel Bars, Pittsburgh	1.35	1.35	1.30	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.85
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.75
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	1.45	1.45	1.45	2.05
Skelp, Sheared Iron, Pittsburgh	1.50	1.50	1.50	2.10
Sheets, No. 27, Pittsburgh	2.15	2.20	2.20	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.55	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.70	1.70	2.10

METALS:

Copper, New York	12.75	12.50	12.50	14.50
Spelter, St. Louis	4.80	4.80	4.82½	5.25
Lead, New York	4.50	4.50	4.40	4.65
Lead, St. Louis	4.40	4.45	4.35	4.57½
Tin, New York	28.85	27.75	28.10	29.25
Antimony, Hallett, New York	7.25	7.25	7.00	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.99

Chicago.

FISHER BUILDING, March 23, 1904.—(By Telegraph.)

Both buyers and sellers have their ears to the ground in an endeavor to catch a sign of what will turn up next. Elements of strength in the market slightly outweigh elements of weakness, and the general tendency is upward, though there is no scramble to cover on the part of buyers, and there is not likely to be any while general business conditions remain where they are, and while the mills and furnaces have a producing capacity in excess of the demand. Southern Pig Iron is still held nominally at least at \$10, with whisperings of lower prices offered confidentially to large buyers. Northern Iron seems to be strong at \$14, with one large producer squarely pledged at \$14.50. A disturbing factor on both Northern and Southern Iron is the 13 days cut on freights on Southern Iron from the Ohio River northward, amounting to 35c. per ton. This cut will apply only to iron that moves between the river and Chicago from March 19 to 31, inclusive, the old schedule coming into effect on April 1. Had this cut been made a month ago it might have stimulated the movement of Southern Iron while it lasted, but coming as it does now on a strong market the Southern furnaces promptly made it a basis for advances in price at the furnaces while the rate lasts. Doubtless a large tonnage of Iron will move during the 13 lucky days, but the uncertainty of time of shipment between Birmingham and the river is making it extremely difficult for sellers in this market to adjust quotations to conform to the temporary fit of generosity on the part of the carriers. Billets are moving more freely than they have done for some time. This is particularly true of Axle Billets, because of fairly large car orders that have been placed by Western and Southern roads. Structurals are in better demand, with one 4000-ton building placed. Plates

are still weak, though demand from boiler shops and car shops is a little better than it has been, one 2500-ton order having come from a manufacturer of car bolsters. Sheets show a little more strength, though they are still one of the weak members of the family. Bars are strong and active, the chances being that both Iron and Steel will be higher before they are lower. The same applies to Hoops and Bands. Merchant Pipe is one of the most lively and vigorous members of the Steel family, with mills pushed to their utmost to execute orders already in hand and new orders coming every day. There is a fair demand for Boiler Tubes from contract boiler shops, and a very slow demand from railroads. Cast Pipe is strong in tone because of the advances in Pig Iron, though no actual advance has as yet been made. Old Materials are weak, with every likelihood of a decline in grades bought by the large Bar mills. Coke would be an active commodity, if railroads could deliver it, but their shortcomings in this direction are becoming worse each week until the condition has become a serious one. Wire products of every description are in active demand, with mills crowded to their utmost.

Pig Iron.—If the Southern Iron producers had the courage of their convictions they might be able to maintain the \$10 price upon which they took a stand a week ago, but already furnaces in this market are privately suggesting to large buyers that if they make firm offers of \$9.75 these offers will be referred to the furnaces and will doubtless be accepted. Buyers noting this indication of weakness promptly come back with the proposition of a firm offer at \$9.50, and so it goes. A temporary disturbing feature of the Southern Iron market is a reduction of freight rate from the Ohio River northward, amounting to 35c. per ton, making the rate from the Ohio River to Chicago \$1.25, as against \$1.60 formerly, which makes the total rate from Birmingham to Chicago \$3.50 instead of \$3.85. It is understood here that this cut was made as a result of the claims on the part of Southern Iron producers, who represented to the railroads that Northern furnaces were taking away their business and that a cut was necessary, promising a large tonnage if the cut should be made. The E. & T. H. first made a cut of 20c., and Ohio roads retaliated by cutting 35c. This cut in price went into effect last Saturday, March 19, and it raised such a furor in railroad circles that the presidents of the roads took cognizance of it and promptly ordered a restoration of the old rate. The old rate will be restored April 1. This leaves a little less than two weeks in which the cut rate from the Ohio River northward will be in effect, and it will be necessary that the Southern Iron cross the river before April 1 on its northward journey in order to secure the low rate during that interval. When the cut rate was finally promulgated the Southern furnaces promptly boosted their price to \$10, taking most of the advantage to themselves instead of giving it to Northern buyers, as they had promised the roads they would, the result being little or no increase in tonnage to the carrying roads, and a good deal of explaining to do on the part of the railroad officials who made the cut. Northern Iron producers, on the other hand, are taking the advance which they made last week seriously, and there is every indication that they will stay by it. Indeed, one large Northern producer with furnaces at South Chicago announce that their price beginning Monday, March 21, is \$14.50 for No. 2 Iron delivered, team, track or consumers' switch, Chicago. This advance of 50c. is made by that producer because their furnaces are claimed to be already at least 30 days behind their orders. A very large tonnage of Iron was contracted for last week, the bulk of it being for delivery during April, May and June, with occasional orders running into the third quarter. Several thousand tons of this business was in Malleable Bessemer at \$14, with smaller lots sold at 25c. to 50c. higher. It may be said that Southern Iron producers hold the key to the situation, because each advance in price they make and maintain will be reflected in an advance by Northern Iron furnaces, who are only too willing to get as much for their Iron as possible. On the other hand, the Southern Iron producers may as well make up their minds that no cut in freight or in price will prevent Northern Iron people from selling their product, for the Northern furnaces are disposed to cut as low as is necessary at any time in order to sell the output of their stacks. We quote:

Lake Superior Charcoal.....	\$14.75 to \$15.25
Northern Coke Foundry, No. 1.....	14.50 to 15.00
Northern Coke Foundry, No. 2.....	14.00 to 14.50
Northern Coke Foundry, No. 3.....	13.50 to 14.00
Northern Scotch, No. 1.....	15.00 to 15.25
Ohio Strong Softeners, No. 1.....	15.30 to 15.80
Ohio Strong Softeners, No. 2.....	14.80 to 15.30
Southern Silvery, according to Silcon.....	14.85 to 15.85
Southern Coke, No. 1.....	14.35
Southern Coke, No. 2.....	13.85
Southern Coke, No. 3.....	13.35
Southern Coke, No. 4.....	12.85
Southern Coke, No. 1 Soft.....	13.60 to 13.85
Southern Coke, No. 2 Soft.....	13.10 to 13.35
Southern Gray Forge.....	12.60
Southern Mottled.....	12.35
Malleable Bessemer.....	14.00 to 14.50
Standard Bessemer.....	15.80 to 16.30
Jackson County and Kentucky Silvery,	
6 to 10 per cent. Silcon.....	16.80 to 18.30
Alabama Basic.....	13.85
Virginia Basic.....	14.60 to 14.85

Billets.—The increasing volume of business coming from makers of car axles indicates that railroads are ordering more cars than is generally supposed. The new plant of the Standard Forging Company at Indiana Harbor is just starting and beginning to become a factor in the Billet market. Prices seem to be maintained almost absolutely at \$24 per ton, Chicago, for Open Hearth or Bessemer Billets, 4 x 4 and larger, and \$25 per ton for Axle Billets and for Forging Billets smaller than 4 x 4.

Rails and Track Supplies.—The Rail business is quiet, both in regard to new business and in specifications on existing contracts. There is no doubt, however, that there are thousands of tons of Rails that should be bought, and orders for which are simply delayed because the roads are not in position to finance such purchases advantageously. Standard Section Rails remain at \$28 per ton, Chicago, and Light Section Rails range from \$24.50 to \$26, Chicago or Milwaukee. Angle Bars are still quoted 1.40c. to 1.50c., Spikes at 1.70c. to 1.80c., base, while Track Bolts have been reduced to 2.30c. to 2.35c., base, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts. The prices on Light Rails and on Track Supplies are by no means inflexible, being reduced when necessary to secure business on a competitive basis.

Structural Material.—One building requiring 4000 tons, in the downtown district of Chicago, has just been placed, and several others are being figured on. A goodly number of smaller contracts are finding their way into the books of the mills, and the Structural business is better in tone than it has been for six months. That it is still not what it ought to be is conceded by every one, but prospects are so bright that there is little complaining. Prices are unchanged, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, \$1 per ton extra. Store prices on Structurals range from 1.95c. to 2c., cut to lengths of 5 feet and over, with occasional lots placed at 1.90c. to meet competition.

Plates.—A slight improvement is noticeable in the Plate market, though it is far from showing the improvement that it should. An order for about 2500 tons comes from a large maker of car bolsters, presumably for the Southern and the Northwestern cars, orders for which were chronicled some weeks ago. Boiler manufacturers are evidently receiving a fair increase in the volume of their business, as reflected in the demand for both Plates and Tubes. No changes in price have been made during the week. We quote, carload lots, from mill, f.o.b. Chicago: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange Steel, 1.86½c.; Marine, 1.96½c.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 inch Tank, 1.86½c.; Nos. 7 and 8, 1.91½c.; No. 9, 2.01½c.; No. 10, 1.91½c. to 1.96½c.; No. 11, 1.96½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. From store Plates are selling at 2c. for Tank quality, ¼-inch and heavier; 2.10c. for 3-16; 2.15c. for No. 8; 2.20c. for No. 10, with 25c. per 100 lbs. for Flange quality.

Sheets.—The meeting of the Independent Sheet Association, which was scheduled for March 9 at Columbus, was called off at the last moment, as it was considered by the leaders that conditions did not warrant a meeting following so soon on the heels of the previous one. The following prices represent the going figures on One Pass Cold Rolled Blue Annealed, No. 18 and heavier, and One Pass Cold Rolled Box Annealed in No. 20 and lighter, in car lots, base size, f.o.b. Chicago, with transactions being done at 50c. to \$1 higher or lower, according to local conditions: Nos. 9 and 10, 1.91½c.; Nos. 11 and 12, 1.96½c.; Nos. 13 and 14, 2.01½c.; Nos. 15 to 17, 2.11½c.; Nos. 18 to 21, 2.16½c.; Nos. 22 to 24, 2.21½c.; Nos. 25 and 26, 2.26½c.; No. 27, 2.31½c.; No. 28, 2.41½c.; No. 29, 2.61½c.; No. 30, 2.71½c. No changes are noted in prices of Sheets from store, which are as follows: Nos. 8 and 10, 2.15c. to 2.20c.; No. 12, 2.20c. to 2.25c.; No. 14, 2.30c. to 2.35c.; No. 16, 2.40c. to 2.45c.; Nos. 18 and 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.55c. to 2.60c.; No. 26, 2.65c. to 2.70c.; No. 27, 2.75c. to 2.80c.; No. 28, 2.80c. to 2.85c.; No. 29, 2.95c. to 3c.; No. 30, 3.10c. to 3.15c. Galvanized Sheets have settled down to a working basis at so much per lb., which is about equivalent to 80 and 3 per cent. discount, Pittsburgh, in car lots, but such agreement as there is between makers is not adhered to strictly, prices being cut occasionally when conditions seem to make it necessary. Store prices on Galvanized Sheets remain unchanged at 75 and 7½ to 75 and 10 per cent. discount.

Bars.—The advance on Steel Bars noted last week is spoken of by interests here as being only the first of a number of advances which are likely to take place, and it is freely predicted that inside of 30 days another \$1 per ton will be added to the schedule. This price of 1.35c., base, Pittsburgh, applies both to Bars and Bands, and there is a disposition on the part of the mills to maintain the price on both absolutely, making Bars or Bands 1.52½c., base, half extras, Chicago, in car lots, with 5c. advance for less than car lots, and with the usual penalties for less than 1 ton and less than 1000 lbs. of a size. Steel Hoops are firm at 1.40c. rates, Pittsburgh, full extras, making them 1.56½c., Chicago, for base sizes. Bar Iron, by an agreement between leading producers, is sold throughout the West on the basis of 1.35c., Pittsburgh, plus full carload freight given

in the Tube Book, with the Chicago price fixed at 1.50c. Producers hasten to explain that this does not mean that Iron Bars are sold at 1.35c., Pittsburgh, nor anywhere near it, but that Pittsburgh is simply made the basing point for convenience in figuring freight rates. A large tonnage has been moving on both Iron and Steel Bars, and the agricultural implement manufacturers and car builders lead in the volume of specifications. Store prices are as follows: Iron or Steel Bars, 1.75c., base, full extras; Hoops, 2.10c. rates, full extras. The Chicago & Northwestern road has ordered a second lot of 500 box cars, and Southern roads are also increasing their orders.

Merchant Steel.—Business is naturally somewhat quiet, as the large buyers were given an opportunity to cover their requirements before the recent advance in prices, and they did so with alacrity, the result being heavy tonnage booked by all mills producing this class of Steel. Prices quoted last week were correct, although at that time there was some doubt among mill representatives here as to which lines would share in the advance on Steel Bars. We repeat quotations as follows: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, 1.56½c. to 1.61½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; Special Tool Steel, 12c. up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—There is no let up in the demand for Pipe of all diameters; in fact, Pipe interests here are figuring on a multitude of specifications that will call for a large tonnage in the aggregate. It is already difficult for mills to make reasonable delivery, both because of the crowded condition of their plants and because of the inefficiency of the carrying roads. No changes in prices have been made, the discounts remaining as follows:

	Steel Pipe.		Guar. Wr't Iron.	
	Black.	Galv.	Black.	Galv.
1/4 to 3/4 inch.....	66.35	56.35	64.35	54.35
1/2 inch.....	69.35	59.35	67.35	57.35
3/4 to 6 inches.....	73.35	63.35	71.35	61.35
7 to 12 inches.....	69.35	59.35	66.35	56.35
Less than carloads, 12½ per cent. advance.				

Boiler Tubes.—A little better feeling is evident in this market, both in the way of large specifications by jobbers and in the multitude of small orders which jobbers are receiving from the contract Boiler shops. The following discounts are still quoted officially by the leading producer, though better discounts are offered when occasion requires by independent mills and doubtless met by the dominant interest when necessary:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches.....	43.35	40.80	53.35
1½ to 2¼ inches.....	55.85	38.35	40.35
2½ inches.....	58.35	43.35	40.35
2½ to 5 inches.....	64.35	50.85	{ up to 4 in. 48.35
6 to 13 inches.....	55.85	38.35	....

Store discounts on Boiler Tubes remain nominally at least as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches.....	40	35	37½
1½ to 2¼ inches.....	50	32½	35
2½ to 5 inches.....	60	45	45
6 inches and larger.....	50	32½	..

Cast Iron Pipe.—No municipal or other contracts of any magnitude have been placed in this market within the week. Several contracts of noteworthy size are now being advertised by towns and cities in Indian Territory and Oklahoma, and these will doubtless be placed within a week or ten days. The advance in Pig Iron prices serves to strengthen prices on Pipe, though there has been no actual advance made as yet. Prices remain unchanged, as follows: 4-inch Water Pipe, \$26; 6 to 12 inch, \$25; larger than 12-inch, \$24, with \$1 per ton extra for Gas Pipe.

Old Material.—There is little demand for Scrap in this market, with the exception of two or three grades on which inquiry is fairly active. Recent advances in new Iron and Steel would doubtless tend to raise prices on corresponding grades of Scrap, but the large stocks carried by the mills and the fact that the supply of Scrap far exceeds the demand is too strong a bear force to be overcome by a flurry in new products. The largest buyers are entirely out of the market, except for small tonnages required to keep up the proper proportion of their different grades. As has been previously reported, the withdrawal of Bar mills at East Chicago and Muncie has dealt a serious blow to dealers and sellers of Scrap in the Chicago market. A demand for small amounts of Dealers' Forge has arisen from Southern Indiana, Pipe and Turnings are being bought by a plant in Central Illinois, and St. Louis is buying Shop Scrap and other light material which requires no shearing. The total tonnage, however, required by these interests combined is small, and as long as the largest buyers continue to be out of the market there is little encouragement for higher prices. Ohio and Pennsylvania have been buying Heavy Melting Steel in this market, and there has been some demand during the last two or three months for Long Length Steel Rails suitable for re-

rolling for use by Chicago mills, but as there are but three buyers of this material two of whom are stocked up from 60 to 90 days, there is every probability that lower prices will rule. Railroad companies are offering liberal quantities of Scrap, the C., B. & Q., for instance, having just issued a list aggregating about 3000 tons, but with the ultimate buyers loaded to the guards dealers are chary about buying this material at present prices. Conditions are decidedly bearish, and already some of the lines on the following list have suffered to the tune of from 50c. to \$1 per ton as compared with their prices of last week. We quote Old Steel Rails, short lengths, \$1 lower; Nos. 1 and 2 Railroad Wrought, 50c. lower, while 25c. and 50c. advance is shown on No. 1 Dealers' Forge, Iron and Steel Axle Turnings and Cast and Mixed Borings. We quote as follows, per gross ton, Chicago:

Old Iron Rails.....	\$16.50 to \$17.00
Old Steel Rails, 4 feet and over.....	13.00 to 13.50
Old Steel Rails, less than 4 feet.....	11.50 to 12.00
Heavy Relaying Rails, subject to inspection.....	23.00 to 24.00
Heavy Relaying Rails, for side tracks.....	18.00 to 20.00
Old Car Wheels.....	14.50 to 14.75
Heavy Melting Steel Scrap.....	11.50 to 12.00
Mixed Steel.....	9.50 to 10.50

The following quotations are per net ton:

Iron Fish Plates.....	\$13.50 to \$14.00
Iron Car Axles.....	17.00 to 17.25
Steel Car Axles.....	14.50 to 15.00
No. 1 Railroad Wrought.....	12.50 to 13.00
No. 2 Railroad Wrought.....	11.50 to 11.75
Shafting.....	13.50 to 14.00
No. 1 Dealers' Forge.....	10.00 to 10.50
Wrought Pipe and Flues.....	8.50 to 9.00
Iron Axle Turnings.....	8.75 to 9.00
Soft Steel Axle Turnings.....	8.75 to 9.00
Machine Shop Turnings.....	7.25 to 7.50
Cast Borings.....	4.75 to 5.00
Mixed Borings, &c.....	4.75 to 5.00
No. 1 Mill.....	7.50 to 7.75
Country Sheet.....	7.00 to 7.25
No. 1 Rollers, cut in sheets and rings.....	9.00 to 9.50
Heavy Cast Scrap.....	12.00 to 12.50
Stove Plate and Light Cast Scrap.....	9.50 to 10.00
Railroad Malleable.....	10.00 to 10.50
Agricultural Malleable.....	9.50 to 10.00

Metals.—Copper is stronger at 12½c. for Casting and 13c. for Lake. Pig Tin also is in better demand and is now quoted at 30c., with spot sales bringing about ¼c. more. Pig Lead is strong and steady at 4.45c. in 50-ton lots, 4.55c. in car lots and 4.85c. in ton lots or less. Spelter is quoted at 5c. Sheet Zinc still sells at 5.65c. per lb. for car lots of 600-lb. casks and 5.85c. for less than car lots. No change is noted in Old Metals, which are quoted as follows: Copper Wire and Heavy, 11½c.; Copper Bottoms, 10½c.; Copper Clips, 10½c.; Red Brass, 10½c.; Red Brass Borings, 8½c.; Yellow Brass, Heavy, 8½c.; Yellow Brass Borings, 6½c.; Light Brass, 6c.; Heavy Lead, 4.25c.; Tea Lead, 4.10c.; Zinc, 3½c.; Block Tin Pipe, 24c.; Pewter, No. 1, 19c.

Coke.—The minimum price for the best grades of 72-hour Connellsville Coke in the Chicago market is \$4.90 per ton in car lots, with some fancy grades holding out about 25c. higher. The 3000 ovens in Wise County, Va., including the Stonega, Colonial and Guestriver brands, are producing Coke which is being sold at from \$2 to \$2.25 at the ovens, and because of the cut freight rate on the L. & N. road is being landed in Chicago at \$4.25 to \$4.50 per ton. No move has been made thus far on the part of other Coke carrying roads to meet this cut of the L. & N., as there is doubtless a feeling that the output of the Wise County ovens is not sufficiently great to warrant a similar cut of 40c. in freight from other Coke producing districts. Car shortage is becoming more serious every week, and the only consolation indulged in by buyers and sellers here is the fact that the situation is as bad as it can be, and for that reason may be better.

Philadelphia.

FORREST BUILDING, March 22, 1904.

The market has taken on a good deal of activity during the past week, and there is an endeavor to create the impression that Pig Iron is scarce. Prices are about 25c. better, but it is one thing to ask a price and another thing to get it. Nevertheless, there is a scarcity of some grades, which is shown by the fact that 25c. more is paid for the second quarter than is asked for the third. There is no probability of any prolonged scarcity, however, as an output of more than 320,000 tons per week is as much, if not more, than can be absorbed during the next three or four months. Business during March has been very satisfactory so far, however, and, compared with the early winter, the improvement is very marked. But a supply of 17,000,000 tons of Pig Iron a year is up to the full average of 1903, and although the last quarter of that year was phenomenally bad, it is hardly likely that 1904 will average equal to its predecessor. There is a large amount of business in prospect, but it is doubtful if it will materialize in the very near future. It takes time to arrange plans and specifications, and what is even more important is to secure adequate finances, and although money is easy, the railroads have been such heavy borrowers that their credit is somewhat

strained, and in case of bad crops or other unforeseen happenings capital would easily take alarm. Under these circumstances a fair volume of business is not improbable, but anything approaching that of 1902 should be regarded as out of the question. In view of the amicable arrangement with the soft coal miners fuel will be abundant and cheap, and as the price of Ores is likely to be arranged satisfactorily, the outlook seems to favor an easier market for Pig Iron rather than otherwise, but, as we said before, it will take time to develop. The improvement in the demand for Finished Material is not as uniform as could be desired, but this will probably adjust itself if the increased interest in the market is based on healthy conditions. Bar Iron and Bar Steel are notably firm and active, but Plates and Structural Material have shown only a slight response so far, but improvement is rather confidently expected in the near future.

Pig Iron.—A considerable amount of interest has been manifested in the market during the past week or two. There is certainly plenty of room for discussion, as some very intricate problems have to be solved during the next month or two. The one commanding feature is in regard to consumption. It may be taken for granted that the supply of Pig Iron during the spring and summer months will be at the minimum rate of 17,000,000 tons per annum, and may reach 1,000,000 tons beyond that. The entire situation hinges on whether so large a tonnage as that will be required. If it is, prices will not go below to-day's figures, but if there is even a very small surplus they will be lower, in spite of all efforts to the contrary. Attempts to bull the market are, therefore, liable to do more harm than good, as any advance that will increase the supply beyond actual requirements will surely lead to a loss of confidence in values and a lower range of prices. It is not impossible that business may assume larger proportions than is expected, but it will be a mistake to advance prices before it is demonstrated that the current output is inadequate to meet current requirements. The policy appears to be to sell all the Iron possible at one price, and when consumers are fully supplied quotations are advanced. If the advance can be realized, well and good; if not, business is taken at the old figures and nothing said about it. This appears to be the position to-day. Large lots were sold two or three weeks ago, prices have been advanced, and in three or four weeks from now it will be seen whether the advance can be maintained. With the prospect of a coal strike eliminated, with lower prices for Ores pending and with a liberal output of Pig Iron in progress, an advance in prices seems to be somewhat inconsistent; but, of course, the problem will solve itself in course of a few weeks. Meanwhile, however, a good business has been done at a trifle over \$15, delivered, for No. 2 X Foundry, about \$13.50 for Standard Gray Forge and \$13 for considerable quantities of Alabama Gray Forge. Asking prices are now above these figures, but in view of the sales recently made, sales are not likely to be of much importance. It is somewhat notable that Southern Irons are taking a strong position in this territory. Sales are being made by analysis to conform with Northern products, and it is claimed that the disparity in prices is likely to be much less than heretofore. The range of prices for Philadelphia and nearby deliveries is about as follows:

No. 1 X Foundry.....	\$15.75 to \$16.00
No. 2 X Foundry.....	15.00 to 15.50
No. 2 Plain.....	14.50 to 14.75
Southern No. 2, rail shipment.....	14.00 to 14.50
Southern No. 2, on dock.....	13.50 to 13.75
Standard Gray Forge.....	13.50 to 13.75
Ordinary Gray Forge.....	13.00 to 13.25
Basic.....	13.75 to 14.00

Steel.—The demand is very active, and prices are firm at \$25 on the very best class of business. Mills are well sold until June, so that earlier deliveries would probably command a premium.

Plates.—The demand is not materially different to what it has been for several weeks past. There is a considerable improvement as compared with January and February, and prospects are favorable for betterment in the near future, but so far it has not developed to the extent that conditions seem to warrant. Prices unchanged, as follows:

	Carloads.	Part carloads.
	Cents.	Cents.
Tank Steel, ¼ inch and heavier.....	1.73½	1.78½
Tank Steel, 3-16 inch.....	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.....	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.....	1.98½	2.03½
Flange or Boiler Steel.....	1.83½	1.88½
Commercial Fire Box Steel.....	1.93½	1.98½
Still Bottom Steel.....	2.03½	2.08½
Locomotive Fire Box Steel.....	2.23½	2.28½
Plates over 100 to 110 inches.....	.05 per lb. extra	
Plates over 110 to 115 inches.....	.10	
Plates over 115 to 120 inches.....	.15	
Plates over 120 to 125 inches.....	.25	
Plates over 125 to 130 inches.....	.50	
Plates over 130 inches.....	1.00	
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10	
Complete Circles.....	.20	
Shell grade of Steel abandoned.		

Structural Material.—The movement is by no means what has been expected, but it is still thought that the delay

is only temporary, and may be in some measure due to the unsatisfactory labor conditions in New York. The demand for bridge work and for structural purposes must necessarily be important in the near future, so that the feeling in the trade is quite hopeful. Prices unchanged, as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specification, and small Angles, 1.50c. to 1.55c.

Bars.—The demand is very good and prices have a strong undertone. Mills have as much work as they can handle and are, therefore, firm at 1.48½c. to 1.50c. for both Steel and Refined Bar Iron.

Sheets.—There is a very satisfactory demand for Sheets and prices are firm. Mills are about as full as they can be to make deliveries as required, but new orders are coming in in rather large volume.

Old Material.—The market is strong, with large sales at considerably higher prices: Steel Scrap at \$15, No. 1 Railroad Scrap at \$18, Iron Rails at \$18, with still higher prices asked for prompt deliveries. Bids and offers are about as follows for deliveries in buyers' yards:

Old Steel Rails.....	\$15.00 to \$15.50
Steel Scrap, light to heavy.....	14.25 to 15.00
Low Phosphorus Scrap, nominal.....	18.00 to 19.00
Old Steel Axles.....	18.00 to 19.00
Old Iron Rails.....	18.00 to 18.50
Old Iron Axles.....	21.00 to 22.00
Old Car Wheels.....	13.50 to 14.00
Choice Scrap, R. R. No. 1 Wrought.....	18.00 to 18.50
Country Scrap.....	16.00 to 16.50
Machinery Scrap.....	13.50 to 14.00
No. 2 Light Scrap.....	12.00 to 13.00
No. 2 Light (Ordinary).....	10.50 to 11.00
Wrought Turnings.....	9.75 to 10.00
Wrought Turnings, Choice Heavy.....	10.50 to 11.00
Cast Borings.....	7.50 to 8.00
Stove Plate.....	12.00 to 12.50
Wrought Iron Pipe.....	12.50 to 13.50

Cleveland.

CLEVELAND, OHIO, March 22, 1904.

Iron Ore.—It is now expected that the Ore Association will hold another meeting about April 1 for the purpose of trying to get to a point where the contending factions can arrive at an agreement. The members of the association have been besieged by the Pig Iron men to grant a reduction, the statement being made that at the old prices of Ore and the present price of Pig Iron furnaces are operating at a loss. Many of the merchant producers are disposed to cut the price of Ore, but the larger producing consumers hold to the old stand that last year's prices ought to be maintained. Nothing has been done toward the chartering of boats for the movement of Ore down the lakes, and the vessel interests are planning to shorten the season of navigation artificially by withholding their tonnage from the trade. No large faith is placed in any such preparation, especially since coal charters are being accepted freely by boats, especially since last year's rates are being paid.

Pig Iron.—The buying of Pig Iron is now on a better basis than it has been at any time for months. It is now evident that the production, although increased, is still short of the demand, and that large quantities are being used out of stock. In some places it is estimated that the amount taken from stock during March will exceed that during February. This has stiffened the price materially, all the furnaces in the valleys, with a single exception, holding for \$13 at the furnace for No. 2. That one furnace continues to accept orders on a lower basis of prices. There has been some talk of \$13.50 in the valleys, but that is not expected immediately, although the technical position of the market is strong. It has been argued that the shortage of Coke was having a material effect upon the sentiment at this time, but the strength seems to be more legitimate than would be indicated by such a statement. The Southern furnaces, although not much of a factor in this territory, are again on a \$10 basis, Birmingham, and holding steady at that price. The demand for Bessemer Pig Iron is on the increase to a certain appreciable extent. Some of the smaller concerns have been buying during the past week. They have not started in heavily as yet, but their trade is indicative. Basic is still in the inquiry stage, with nothing of importance having been done. Both materials are on the basis of \$13 in the valleys. The Coke situation is still very bad. The market might have improved materially, but the railroads have not been able to get any better grip on the situation, with the result that cars are still lacking with which to move that material. The shortage in the car supply is embarrassing some of the furnaces, but has not compelled any suspensions. Prices hold up. Good 72-hour Coke is bringing \$2.25 to \$2.50 at the oven; high Sulphur Coke \$2.15, and good Furnace Coke \$1.75. We continue to quote Pig Iron prices f.o.b. cars Cleveland:

Northern Coke, No. 1 Foundry.....	\$13.75 to \$14.00
Northern Coke, No. 2 Foundry.....	13.25 to 13.75
Northern Coke, No. 3 Foundry.....	12.75 to 13.00
Southern Coke, No. 1 Foundry.....	14.35 to 14.60
Southern Coke, No. 2 Foundry.....	13.85 to 14.10
Southern Coke, No. 1 Soft.....	14.35 to 14.60
Southern Coke, No. 2 Soft.....	13.85 to 14.10
Jackson County, 8 per cent. Silicon.....	16.50 to 17.00
Hanging Rock Charcoal, No. 1.....	.... to 23.45
Southern Charcoal, No. 1.....	19.50 to 20.00
Lake Superior Charcoal.....	16.50 to 17.00

Finished Iron and Steel.—The best activity has been in the light materials, Bars, Hoops and Bands. All of these, having shown recent advances in prices, have continued to be active regardless of the increase. This is particularly true of Bar Steel, where the advance of \$1 in Bessemer did not stop the market. The buying here started with one 500-ton order, and continued very heavy all week, the aggregate tonnage being very satisfactory. Hoops had also been advanced, and the buying was strong there. Bar Iron still feels the effects of the advance in the price of Scrap, and also the better tone in the market. Steel Bar prices hold at 1.35c., Pittsburgh, for Bessemer, and 1.40c., Pittsburgh, for Open Hearth. In the heavier lines the railroads seem to be the key, and appear to be holding off for the time being. Rail purchases have been light, being confined to negotiations by some traction companies. The price holds at \$28, Pittsburgh. Light Rails are in good demand at \$24 to \$25, Pittsburgh. The buying of Structural does not seem to have started in as yet in the volume which might possibly be indicated by other market conditions. There are some good orders, and the situation looks strong, but the biggest consumers have not been covering their needs to the extent they did this time a year ago. The call for Plates has been steady, but not heavy. The specifications against old contracts are good, and on the whole the market is strong. The price holds at 1.60c., Pittsburgh. There has been a fair call for Sheets, but the market has been only holding steady. It may be said that the tendency on the part of the small producers to cut the price is disappearing, and the producers are holding steadily to the old basis of prices quoted by the association. This list runs: For No. 27 Black Sheets out of stock, 2.50c.; for No. 27 Black Sheets in car lots at the mill, 2.25c. to 2.30c.; for Nos. 16 to 20 Galvanized Sheets out of stock, 75, 10 and 5 off list, and for No. 22 and lighter, 75, 10 and 7½ off list.

Old Material.—The Scrap trade in this territory is on the mend. In fact, a big improvement has been seen in both the inquiry and the purchases of all materials with the possible exception of Stove Plate and Cast Scrap, which seem to be a little weak. The market is inclined upward, but without any breaks. The following shows the list of prices, all gross tons: Old Steel Rails, \$14 to \$15; Old Car Wheels, \$13.50 to \$14.50; Railroad Malleable, \$11.25 to \$12.25; Heavy Melting Steel, \$13 to \$14. All net tons: Cast Borings, \$5; No. 1 Railroad Wrought, \$12 to \$13; No. 1 Busheling, \$11 to \$12; Wrought Turnings, \$7.50; Iron Car Axles, \$18; No. 1 Cast Scrap, \$11.50 to \$12; Stove Plate, \$9 to \$10.

Cincinnati.

FIFTH AND MAIN STS., March 23, 1904.—(By Telegraph.)

Now that the excitement in the market is beginning to abate it is very evident that there has been a tremendous purchasing movement in Southern Iron. This movement has been somewhat checked by the advance in price in No. 2 Foundry from \$9 to \$10, but it has not been stopped by any means. The wholesale buying occurred last week, when many thousand tons were sold in this market. This swept the market clean of all available Gray Forge and Mottled Iron on hand in the South and all that can be made within the next 60 days at least. This week there have been several large inquiries for Gray Forge, but it is not to be had and the market for this grade is very strong. Two weeks ago it was almost a drug on the market, and being unsalable, and with large quantities on hand, it threatened to seriously embarrass the furnacemen. The bulk of it was sold from \$7.75 to \$8, Birmingham, although sales have since been made all the way from \$8 up to \$9. This was presumably not as profitable to the furnacemen as they could wish. The movement in the softer Foundry grades has not been quite so sensational, but at the same time was rather unexpected. Many foundrymen were confidently expecting that when No. 2 Foundry was \$9 they could later buy it for \$8.50, and let the opportunity slip by. It is understood that some little spot Iron has been sold at \$9.75, but standard brands for shipment over the second quarter of the year are \$10. There is quite a lively inquiry for Southern Iron for shipment over the last half of the year, but so far as can be learned, sellers are making no quotations beyond June. Sales during the week have not been individually large. There have been 1000 or 2000 ton lots and quite a number of 500 and 250 ton orders. Freight rates from Hanging Rock district to Cincinnati, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$13.00 to \$13.25
Southern Coke, No. 2.....	12.50 to 12.75
Southern Coke, No. 3.....	12.00 to 12.25
Southern Coke, No. 4.....	11.50 to 11.75
Southern Coke, No. 1 Soft.....	13.00 to 13.25
Southern Coke, No. 2 Soft.....	12.50 to 12.75
Southern Coke, Gray Forge.....	11.50 to 11.75
Southern Coke, Mottled.....	11.25 to 11.50
Ohio Silvery, No. 1.....	16.15 to 16.40
Lake Superior Coke, No. 1.....	14.15 to 14.40
Lake Superior Coke, No. 2.....	13.65 to 13.90
Lake Superior Coke, No. 3.....	13.15 to 13.40

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$17.00 to \$17.50
Lake Superior Car Wheel and Malleable	17.00 to 17.50

Coke.—The demand for Coke is still on the upward grade, and a good, healthy condition prevails. Prices are showing some small advance and the general trend is forward. We quote from \$2.15 to \$2.30 on West Virginia, and from \$2.25 to \$2.50 on Connellsville products, f.o.b. ovens.

Plates and Bars.—The situation in the Plate and Bar market is one continued improvement. Orders are more general and a much better tone is noticeable. Structural Iron is also coming in for its share of the demand, and indications are good for continued activity. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras. Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—While there is very little demand and a dearth of business generally, dealers are somewhat encouraged with the outlook and anticipate a change for the better before many days. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$11 to \$11.50 per net ton; No. 1 Cast Scrap, \$10 per net ton; Iron Rails, \$14.50 per gross ton; Steel Rails, rolling mill lengths, \$11 to \$11.50 per gross ton; Iron Axles, \$15 per net ton; Car Wheels, \$11 to \$11.50 per gross ton; Heavy Melting Scrap, \$11.50 per gross ton; Low Phosphorus Scrap, \$11.50 to \$12 per gross ton.

Pittsburgh.

PARK BUILDING, March 23, 1904.—(By Telegraph.)

Pig Iron.—There is a good deal of inquiry for Bessemer Iron for March and April shipment, and very little Iron is being offered for these deliveries. Firm offers of \$13.50, Valley furnace, have been made for Bessemer Iron for March shipment without getting the Iron. For delivery in April, May and June, Bessemer is quoted at about \$13.25, Valley furnace. We note sales of about 5000 tons of Bessemer Pig Iron for March and April shipment at \$13.25 to \$13.50, Valley furnace, the latter price being paid for several small lots of March Iron. We note a good deal of inquiry for Foundry Iron, and most of the Valley furnaces are no quoting on the basis of \$14, Pittsburgh, which is equal to \$13.15 at furnace. We note sales of about 3000 tons of Northern No. 2 Foundry Iron at prices ranging from \$13.75 to \$14, Pittsburgh. Several furnaces in the Cleveland district are holding No. 2 Foundry Iron at \$13.50 at furnace. We note a sale of 4000 tons of Northern Gray Forge Iron at \$13, Pittsburgh, made a week or ten days ago, but Forge is higher to-day, being quoted at \$13.35 to \$13.50, Pittsburgh. The Pig Iron market is extremely firm and higher prices are predicted, especially on Iron for early delivery.

Steel.—There is a fair amount of inquiry for Steel, and a number of sales of Bessemer Billets and Sheet Bars are reported at the official prices. There seems to be a scarcity of Sheet Bars for prompt shipment, the mills rolling Sheet Bars being heavily oversold. The Billet Association meets in New York on April 14, but it is not expected there will be any change in prices. We note a sale of 300 tons of Bessemer Billets and one of 500 tons of Open Hearth Sheet Bars at official prices. Bessemer and Open Hearth Billets are \$23; Sheet Bars, long length, \$23.50, and cut to lengths, \$24, Pittsburgh. All but two of the Steel plants of the United States Steel Corporation, these being Sharon and Columbus plants, are being operated to full capacity, and yet the Carnegie Steel Company are short of Steel at some of their finishing mills.

(By Mail.)

On Friday, April 1, the Ore interests expect to come together in New York, but as to whether the Ore Association will be renewed for this year opinion is divided. It is recognized that there ought to be some basis for prices of Ore, but the differences existing between the largest consumers of Ore and the sellers are so great that some doubt is expressed as to whether the two factors can be brought together. It is safe to assume that prices of Ore for this year will be at least 50c. a ton lower than last year and perhaps more than that.

General conditions in the Iron trade are good, and the feeling is altogether different from that which prevailed in January or February. More tonnage is being placed and the general tone of the market is strong. It was definitely settled last week that there would be no strike of the bituminous coal miners, and this has cleared one of the uncertain features of the market. The car situation does not show improvement, but seems to be getting worse as tonnage increases. In the Connellsville region it is particularly bad, and heavy stocks of Coke are piled up waiting cars for shipment.

While nothing official has been given out, it is the impression that the United States Steel Corporation will exer-

cise the option for 40,000 tons of Pig Iron which they hold at \$13, Valley furnace, and which expires on April 10. The corporation are urging prompt shipments of Pig Iron to their different plants, and the Valley furnaces are shipping in this Iron as fast as possible. We note some inquiry for Basic Iron, which has advanced fully 50c. a ton within the last few days. A week or ten days ago Basic Iron sold as low as \$12.75, Valley, but in the last few days \$13.50 at furnace has been done. Bessemer Iron for March and early April shipment has sold in small lots at \$13.50, Valley, or \$14.35, Pittsburgh. On large lots for extended delivery about \$13.25 is being quoted. There is a fair demand for Foundry Iron, which is very firm on the basis of \$13 to \$13.25, Valley furnace. Forge Iron is also in better demand and is held at \$12.75 to \$13, Valley. A meeting of the Billet Association is scheduled to be held in New York on Thursday, April 14, and while there are intimations that Sheet Bars may be advanced, it is probable there will be no change either in price of Billets or Bars. There is an actual scarcity of Sheet Bars for prompt delivery, and Sheet mills are having trouble to get them fast enough. The balance of the market on Finished Iron and Steel is in very satisfactory shape, with the single exception of Plates, demand for which is dull and the outlook not very bright.

The action of the Amalgamated Association in making a reduction of 20 per cent. in wages in Tin Plate and Sheet mills may possibly unsettle the market slightly on these products, but at the same time it should be remembered prices for both Sheets and Tin Plate have been very low, based on the price of Steel and labor, and there does not seem to be much chance of them going lower.

Ferromanganese.—There is very little doing, most consumers being covered ahead. We quote English and domestic Ferro at \$42 to \$42.50, delivered.

Muck Bar.—There is more inquiry for Muck Bar than for some time and prices are higher, owing to an advance in Forge Iron. We quote best grades of domestic Muck Bar at \$26.50 to \$27, Pittsburgh.

Wire Rods.—There is not much inquiry, but Wire Rods are firm on the basis of \$31 to \$32, Pittsburgh, for Bessemer and Open Hearth. The latter price is for Rods for prompt shipment.

Steel Rails.—The market is extremely quiet, and it is officially denied that the Pennsylvania Railroad will place a large order in the near future. The further statement is made that the Pennsylvania will not buy any Rails this year. We quote at \$28, at mill, for Standard Sections.

Railroad Spikes.—A moderate amount of new business is being placed, and the two local mills have a good deal of tonnage on their books. We quote at \$1.60 to \$1.65 per 100 lbs.

Structural Material.—While a good deal of work is in sight, much of it is being held back on account of the labor situation and money conditions. Contracts placed recently include a large office building at Dayton, Ohio, about 1200 tons, and the Chandler office building at Atlanta, Ga., about 2500 tons, both taken by the American Bridge Company. Bids are all in for the contemplated warehouse on the South Side, this city, which will require from 10,000 to 15,000 tons, depending on the kind of structure erected. It is not known yet whether this project will go through. There is no trouble whatever in getting prompt deliveries of material. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—The quarterly meeting of the Plate Association will be held in New York on Thursday, April 7. No change in present prices is anticipated. Demand for Plates is light, and there is a good deal of complaint from the mills over the small tonnage being placed. The Steel car shops are doing practically nothing. We quote: Tank Plate, 1/4-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine Ordinary Fire Box, American Boiler Manufacturers', 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauge Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—The reduction of 20 per cent. in wages of Sheet mills made by the Amalgamated Association, which went into effect March 21, is the principal event of the week. As to whether it will unsettle prices of Sheets remains to be seen. At present Sheets are only fairly firm, several of the independent mills being disposed to shade prices slightly when necessary to secure tonnage. Demand for Sheets is better than for some time, and in view of the scarcity and high prices of Sheet Bars it does not seem probable that prices can go much lower than they are now. A material increase in demand for Sheets is expected in April. We quote: No. 26 Black Sheets at 2.10c. to 2.15c.; No. 27, 2.15c. to 2.20c., and No. 28, 2.25c. to 2.30c., all f.o.b.

at mill. The lower prices are available only on large lots. Galvanized Sheets are about 80 and 5 per cent. off, which is equal to 2.85c. for No. 26, 3.04c. for No. 27, and 3.23c. for No. 28. For small lots from store jobbers charge the usual advance over these prices.

Iron and Steel Bars.—The market on both Iron and Steel Bars is extremely firm, and the mills are better filled up than for some time. Iron Bars have been advanced \$1 a ton, corresponding to the advance in Steel Bars, and are now held at 1.40c., Pittsburgh. Prior to the advance in Steel Bars a very large tonnage was placed, and specifications on these contracts are now coming forward very freely. We quote Steel Bars at 1.35c., Pittsburgh, in carloads and larger lots, with the usual differentials for less than carloads. Open Hearth Bars take \$1 a ton advance over Bessemer.

Hoops and Cotton Ties.—On Thursday, March 17, the price of Cotton Ties was advanced 5c. a bundle, and we now quote these at 80c. per bundle in 3000 bundle lots and over, and 83c. per bundle for less than 3000 bundle lots. A good deal of tonnage was entered prior to the advance in prices. We quote Steel Hoops at 1.40c. and Steel Bands at 1.35c., extras as per Steel card.

Merchant Pipe.—The Pipe trade continues to be characterized by a heavy demand, which keeps the mills filled, and which takes their output as fast as made. Some of the mills of the leading interest are not running to full capacity, owing to shortage in supply of Skelp. It is stated the Manufacturers' Light & Heat Company will build another large gas line this summer, which will require a heavy tonnage of Line Pipe. The market is firm, discounts to consumers in carloads being as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
1/4, 1/2 and 3/4 inch.....	68	58	66	56
1/2 inch.....	71	61	69	59
3/4 to 6 inches.....	75	65	73	63
7 to 12 inches.....	71	61	68	58
Extra strong, plain ends, 1/2 to 8 inches.....	67	57	64	54
Double extra strong, plain ends, 1/2 to 8 inches.....	59	49	56	46

Boiler Tubes.—We are advised the demand for Boiler Tubes is very active, the mills entering more tonnage than for some time. Prices are fairly firm, discounts in carload lots being as follows:

	Steel.	Iron.
1 to 1 1/2 inches.....	42 1/2	39
1 1/2 to 2 1/4 inches.....	55 1/2	38
2 1/4 inches.....	58	43
2 1/2 to 5 inches.....	64 1/2	50 1/2
6 to 13 inches.....	55 1/2	38

Tin Plate.—Demand for Tin Plate is quite active, but on large lots there is some shading of the official price. The reduction of 20 per cent. in wages in Tin Plate mills, just granted by the Amalgamated Association, may possibly unsettle prices of Tin Plate to some extent. We quote 100-lb. Coke Terns at \$3.45 per box, f.o.b. Pittsburgh, which carries the usual slight differential to the large trade. Some mills advise us they are able to get about 5c. per box advance over the official price for prompt shipment.

Spelter.—The market is quiet, and while prices are unchanged they are weak. We quote Prime Western Grades at 4.90c. to 4.95c., Pittsburgh.

Old Material.—The Scrap market is rather quiet, except for Heavy Melting Stock, which is in good demand and which is held at \$14 to \$14.25, Pittsburgh. We note a sale of 250 tons at \$14, delivered. No. 1 Wrought Scrap is about \$13.50 in net tons; Cast Scrap, \$12.75 to \$13, gross tons; Rerolling Rails, \$15.50, gross tons; Busheling Scrap, \$10.50 to \$11, net tons. Old Steel Rails, short pieces, \$14 to \$14.25, gross tons.

Coke.—We note an active demand for both Furnace and Foundry Coke and prices are very firm, owing to the shortage of cars, which seems to be getting worse. A good deal of Coke is piled up in the yards in the region awaiting cars for shipment, and some of the furnaces are actually suffering for want of Coke. Strictly Connellsville Furnace Coke for prompt shipment is held at \$1.60 to \$1.65, at oven, and some sales are reported at \$1.75 a ton. Best grades of Connellsville Foundry Coke are held at \$2.35 to \$2.50 a ton at oven. Coke from other districts is being sold at lower prices than the above.

The offices of the Oliver Iron & Steel Company, Frick Building, Pittsburgh, will be removed April 1 to the Oliver Iron & Steel Company office building, South Tenth and Muriel streets, South Side, Pittsburgh.

The National Tube Company of Pittsburgh have donated \$5000 to the McKeesport Hospital, at McKeesport, Pa.

The New York Machinery Market.

NEW YORK, March 23, 1904.

During the week just concluded the general machinery business has shown a considerable improvement over that of the previous few weeks, and is now about normal. For the past two months there has been a gradual increase in trade, but not in that time have the general conditions been in such good shape as they are at present. No large orders are reported, but there have been good medium and small bookings, and the inquiries are numerous. Since the first of the year almost each week has produced a characteristic feature in one certain line of the machinery trade, and that branch has prospered, while others were not so fortunate, but at this writing both specialists and generalists are busy, and all are feeling confident of a good spring business. Many large propositions are taking shape in a way that indicates extensive purchases of machine shop, foundry and power plant equipment within the next month or two, while there are other projects of large proportions which bid fair to be put through this summer. One of the chief causes for this feeling of confidence is the large amount of machinery which the contractors will require for building the Pennsylvania Railroad tunnels, and which will affect nearly all branches of mechanical equipment.

Now that the contracts have been let and preparations started for the construction of the Pennsylvania Railroad tunnels underneath the North and East rivers, the machinery houses are anxiously awaiting their share of the orders to be placed by the contractors for carrying on the work. The machinery required for the fulfillment of these two contracts will aggregate \$1,700,000, exclusive of power plant equipment, which will be further augmented when awards shall have been made for the building of the complete system. As stated in another column, the contracts of the O'Rourke and Pierson companies cover only the tubes from shore to shore, those for the land sections, including the tunnel across Manhattan, having not yet been awarded. In addition there will be required equipment for large power stations which are to be located at each end of the two sections, as work is to progress simultaneously from both ends toward the middle. Of this amount of machinery S. Pierson & Son, Limited, of London, who have the contract for the tunnel from Long Island City to New York, and whose New York correspondents are Carr Bros., 61 Broadway, will buy about \$1,000,000, and the O'Rourke Engineering Construction Company, 26 Cortlandt street, New York, who have the contract for the tunnel from New York to Jersey City, N. J., will buy about \$700,000. Both companies are planning to commence operations as soon as possible, which necessarily means the preparation of lists of machinery that will be needed to start work. It is probable that these lists will not be sent out for bids, but that the initial installments will be purchased from data already in hand, as the contractors have been deluged with letters and catalogues from manufacturers and are well posted as to prices and other particulars. After the first installation has been made it is the intention as the work advances to purchase the additional machinery as it may be required.

To their already enormous extension of shops, some of which are under construction and some of which have lately been completed, the Pennsylvania Railroad Company intend to add new buildings that will call for the purchase of a large quantity of additional mechanical equipment. The company are having plans prepared for machine shops to be erected at Olean, N. Y., the main building of which will be 192 x 194 feet. The plans for this building are in the hands of Philadelphia contractors, who are now figuring on its construction. In this connection it will be of interest to note that the company are considering the erection of large car and repair shops in the outskirts of Trenton, N. J. We are officially informed, however, that the plans for the buildings have not yet been prepared, and it is not intended to build these shops at the present time.

For a long time the trade have been keeping an eye on the Erie Railroad Company with the expectation of seeing some very large shop, roundhouse and terminal extensions started by the company. It has been generally understood that the company were much in need of better facilities at Jersey City, and that the management were planning important improvements for that point, as well as at other points along the line. With this end in view they are preparing plans for new shops and for additions to the present ones, but as the details have not yet been settled, the magnitude of the operations to be undertaken this spring are not known. We can state, however, that announcement will be made within the next month or six weeks of at least part of the plans. While no information can be obtained as to the location of their proposed new shops, it seems likely that they will be erected at Jersey City, where, it is reported, they have recently purchased a tract of 160 city lots bounded by Monmouth, Eleventh, Division and Sixteenth streets, with an irregular plot running to Hoboken avenue.

It is rumored in the street that the Southern Railway Company are about to place some good sized orders for ma-

chine tools for equipping their proposed new shops at Spencer, N. C. The company purchased a small lot of tools some few weeks ago, but it is not believed that these were for installation at that point. If they were, they constituted only a small part of the requirements, as the shops in that city are to be extensively enlarged. The contracts for the buildings have been let and work of construction will be started as soon as the weather will permit.

The Baltimore & Ohio Railroad Company are proceeding with the construction of their new shops at Glenwood, Pa., where they are planning to double both their shop and yard facilities. The company have reached no definite conclusion yet regarding the improvements to be made at the Pittsburgh terminal.

The Singer Mfg. Company, New York, will start work in the early summer upon the construction of their large new plant at St. John, N. B., with the expectation of getting it in operation in the fall. The company have purchased a site of 35 acres and will erect thereon complete works, the plans for which are being prepared by E. H. Bennett, vice-president, whose headquarters are at Elizabethport, N. J. Mr. Bennett sailed for Europe the early part of the week, to be gone for from four to six weeks, and we understand that upon his return contracts for the buildings will be let. A great deal of the equipment required is special and will be built by the company themselves, but in addition to this they will need a large number of regular machine tools.

The United States Malleable Iron Company, Toledo, Ohio, who are erecting large additions to their plant, have sent out the following list of machines that they will require, orders for which, they inform us, they will place in about two months: One shaper, 26-inch stroke, 26-inch cross travel; one engine lathe, 9-inch radius swing, 6-foot bed, with one four-jaw chuck, 9 inches diameter, one two-jaw chuck, 12 inches long, 4½ inches wide, 2½-inch jaw, one chuck for drills 0 to 1 inch; one drill press, 20-inch swing, 16-inch table, hand feed, with one chuck for 0 to 1 inch drill; one speed lathe, 10 or 12 inch hollow spindles, 8-inch radius swing, with slide rest; one chuck, 0 to 1 inch drill; one three-jaw chuck, 6 inches diameter; one milling machine for slotting metal patterns; one band saw, 36 inches, with three saws, ½, ¾ and 2 inches; one 16-inch jointer; one 20-inch emery water wheel; one ¾-inch bench emery dry wheel stand, with two 8-inch wheels, one with round edge; one hand trimmer, 16 inches over all; one sheet metal shears, 12-inch cut; one 60 horse-power engine, with 1-5 cut off, 90-pound steam pressure slide valve, high speed automatic and compound automatic; one 100 horse-power boiler for 130 pounds steam pressure. The company will require a guarantee as to the efficiency of boiler and engine, and the quantity of coal required to operate them.

It is probable that the Johnson Forge Company, Wilmington, Del., will shortly be in the market for considerable equipment for their new plant, which is to replace that destroyed by fire last fall. The plant will cover about 53,000 square feet and will consist of several buildings one-story high, constructed of wood, with slag roof. The contract for the buildings has been let, and building operations will be started within a few days. The company manufacture locomotive, truck and car axles and merchant bar iron.

Of more than ordinary interest to many will be the bids submitted and final award made by the Government for the turbo-generator which is to be installed at the New York Navy Yard. The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until April 23 for the turbo-generator, with exciter set, fire induction motors, one motor generator, two switchboards and accessories. The estimated cost is \$44,000.

Ground has been broken and contracts let for a 75-foot addition to the new machine shop of the Hyatt Roller Bearing Company at Harrison, N. J. Although it is six months since their large shops were completed, the constant increased demand for Hyatt bearings has made it necessary to again increase the plant. The new addition will be of brick construction, two stories high. The ground floor will be fitted with modern heavy machine tools, while the second floor will be used exclusively for assembling automobile bearings. The buildings will be completed by May 15.

The Perkins Machine Company, South Boston, Mass., have purchased the property at Warren, Mass., formerly occupied by the Slater Engine Company. The plant consists of a large machine shop and foundry. The Perkins Company will continue the manufacture of their power presses at South Boston until the moving has proceeded well on toward completion. The work of moving was begun this week, and is expected to be completed by June. The Perkins Company had planned to erect a new plant in the immediate vicinity of Boston, and plans had been prepared, but the failure of the Slater Engine Company left the Warren property on the hands of the owners and the Perkins Company took advantage of the opportunity.

The property of the Grant Tool Company, at Franklin, Pa., recently sold at receiver's sale to William J. Bleakley, has been transferred by him to a new concern, known as the Franklin Machine & Tool Company. The officials of the concern are Charles Miller, president; W. J. Bleakley, vice-

president; E. W. Snook, treasurer, and T. C. Uran, secretary.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 26 for the following supplies for the Portsmouth, Boston and New York navy yards:

- One 24-inch electrically driven engine lathe.
- One electrically driven deck winch.
- Seven 20 horse-power electric motors.
- One 350-pound single frame steam hammer.
- One No. 4 shop saw.
- Two water tube steam boilers.
- Shavings exhaust system.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 5 for a quantity of supplies for the Portsmouth and Boston navy yards and the naval training station at Newport, R. I., including boiler feed pumps, ventilating system, &c.

The following bids were opened March 15 for supplies for the New York navy yard:

Bidder 1. Reliance Machine & Tool Company, Cleveland, Ohio.

- 6. Sprague Electric Company, New York.
- 14. Doubleday-Hill Electric Company, Pittsburgh, Pa.
- 17. Geo. Place, New York.
- 22. Drew Machinery Agency, Manchester, N. H.
- 25. Niles-Bement-Pond Company, New York.
- 29. C. & C. Electric Company, New York.
- 32. Keystone Electric Company, Erie, Pa.
- 35. Crocker-Wheeler Company, Ampere, N. J.
- 37. Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.
- 44. J. D. Van Dyck Company, New York.
- 46. Berlin Machine Works, Beloit, Wis.
- 52. Holtzer-Cabot Electric Company, Boston, Mass.
- 60. Erie Foundry Company, Erie, Pa.
- 66. Hendy Machine Company, Torrington, Conn.
- 69. Fairbanks Company, New York.
- 73. Manning, Maxwell & Moore, New York.
- 75. Thresher Electric Company, New York.
- 78. D'Olier Engineering Company, Philadelphia, Pa.
- 83. S. A. Woods Machine Company, Boston, Mass.
- 84. Williams, White & Co., Moline, Ill.
- 85. B. F. Sturdevant Company, Boston, Mass.
- 87. Handlan-Buck Mfg. Company, St. Louis, Mo.
- 90. General Electric Company, Schenectady, N. Y.

Class 1. Sixteen electric motors—Bidder 22, \$4678; 52, \$5269; 29, \$5303; 32, \$6100; 78, \$6195; 90, \$6334 and \$5971; 75, \$6362.75; 35, \$6409.50 and \$6241.50; 14, \$6612.30; 37, \$7188; 6, \$7581.

Class 2. One slow speed six-pole single-field coil electric motor—Bidder 6, \$360 (?).

Class 3. Six motor generators—Bidder 75, \$5002; 32, \$5440; 90, \$5734; 35, \$8649.50.

Class 4. Two generating sets, 16-kw. and 125 volts, four generating sets, 24-kw. and 125 volts, together with a long list of spare parts—Bidder 85, \$34,436.05; 90, \$34,809; 75, \$40,726.70; 35, \$43,936.70.

Class 52. One turret head bolt cutting machine—Bidder 73, \$287 and \$255; 25, \$472.

Class 53. One power punching and shearing press—Bidder 87, \$415; 22, \$470 and \$425; 25, \$478; 69, \$500; 84, \$510; 44, \$525.

Class 54. One 8-foot squaring shear—Bidder 60, \$1200; 25, \$1345; 22, \$1510 and \$1775; 44, \$1800.

Class 55. One double bolt cutter—Bidder 22, \$736 and \$756; 1, \$758; 73, \$777; 25, \$798.

Class 56. One heavy self feed rip saw machine—Bidder 46, \$975; 83, \$1200; 17, \$1394.

Class 57. Two new model engine lathes—Bidder 73, \$330 and \$280; 66, \$666 and \$838; 25, \$874.

Class 58. One giant dimension planer—Bidder 83, \$1960; 17, \$2720.

Class 59. One six-roll double surface planing machine—Bidder 83, \$1938; 46, \$2000; 17, \$2650.

G. P. Altenberg, manager of the foreign department of J. A. Fay & Egan Company, the large manufacturers of wood working machinery, is on his way to Europe. He will first visit England and will then tour the Continent. He expects to be several months abroad. Letters to him will arrive, if addressed as follows: G. P. Altenberg, 31 Boulevard Haussmann, Paris, France.

McDowell & Co., dealers in engines, boilers, pumps, machinery, &c., have moved their offices from Pittsburgh to the warehouse at Grant and Western avenues, Allegheny, Pa.

The Pittsburgh works of the American Sheet & Tin Plate Company, at New Kensington, Pa., which have been idle for nearly six months, will probably be started next week. The plant contains six hot and seven cold mills.

PERSONAL.

J. D. Tipple has succeeded W. Rudge as secretary of the Forsyth Pattern Company of Youngstown, Ohio.

The Allis-Chalmers Company have appointed Asa M. Mattice as their chief engineer, or technical director. His headquarters will be in Milwaukee, and he will assume the duties of his new office about April 1. Mr. Mattice goes to Milwaukee from East Pittsburgh, Pa., where he has been consulting engineer of the Westinghouse Electric & Mfg. Company and chief engineer of the Westinghouse Machine Company. He was graduated from the United States Naval Academy in 1874, at the head of a class of engineers, the same class in which B. H. Warren, the new president of the Allis-Chalmers Company, graduated. He served in the engineer corps of the navy until 1889, when he resigned, and was for a number of years chief assistant to E. D. Leavitt, consulting engineer, at Cambridgeport, Mass., where his work was principally in connection with large mining machinery, pumping engines, mill plants and power plants.

James H. Davis, who for the last 18 years has been the New York representative of Wetherell Bros., steel and wire merchants of Boston, Mass., has resigned his position and will shortly sail for Europe.

Chester R. Baird, formerly of Philadelphia, is now president and general manager of the California Iron & Steel Company of Los Angeles, Cal.

E. A. Bayrd of the St. Louis branch of Matthew Addy & Co., of Cincinnati, who sailed for Naples recently, will proceed north through Italy as the season advances, spending the last half of June in England and Scotland. Mr. Bayrd expects to reach home early in July.

At the annual meeting of the Cambria Steel Company, held last week in Philadelphia, George F. Baer, Theodore N. Ely and Frank J. Firth were elected directors.

OBITUARY.

S. LLOYD WIEGAND, a patent attorney and inventor of national reputation, was found dead in bed at his home, in Germantown, Pa., on March 8, heart disease being the cause of his death. Mr. Wiegand, who was 70 years old, had been interested in mechanical devices since boyhood. At the Centennial Exposition in 1876 he was awarded first premium for a system of boiler inspection. Later he patented the Wiegand boiler, which is in general use. He was a native of Philadelphia and had lived there all his life.

JAMES P. WITHEROW, formerly one of the best known engineers in the country, died at his home in Pittsburgh, on Sunday, March 13, of pneumonia, after an illness of two weeks. For many years Mr. Witherow was in the blast furnace engineering business under the name of Witherow & Gordon, which was afterward changed to James P. Witherow. He conducted large foundry and machine shops at New Castle. At one time Mr. Witherow was quite wealthy, but in later years his fortune had been materially reduced by unfortunate investments.

JOSEPH L. BAILEY, formerly owner of the Glendale Iron Works, Pottstown, Pa., which he conducted for many years, died March 11, from rheumatism of the heart, at his home, at Pine Iron Works, near that city, aged 70 years. Mr. Bailey retired from active business several years ago.

WILLIAM WILCOX, founder of the Wilcox Mfg. Company, Middletown, Conn., a half century ago, died on March 13th, after a short illness. He was born in Killingworth, Conn., October 10, 1819, and after leaving school entered the gun factory of Smith & Cooley, Middletown. In 1842 he began the manufacture of locks, later making a specialty of plate locks for the Southern trade, and afterward going into the manufacture of padlocks, by which business he became widely known to the hardware trade.

New York.

NEW YORK, March 23, 1904.

Pig Iron.—The market is fairly active, some good sales having been made, and some round inquiries being in hand. Among the former we note a lot of 3000 tons of 2 per cent. Silicon Iron at \$13, at furnace, while among the latter is a lot of close to 10,000 tons for the various plants of a leading electrical company. The majority of Southern furnaces are holding at \$10, at Birmingham, for No. 2, but occasionally somewhat lower prices are being made. We quote: Northern No. 1, \$15.25 to \$15.50; No. 2 Foundry, \$14.75 to \$15.25; No. 2 Plain, \$14 to \$14.25, and Gray Forge, \$13.25 to \$13.50. Tennessee and Alabama brands are quoted \$13.50 to \$13.75 for No. 2 Foundry, and \$13 to \$13.25 for No. 3 Foundry.

Steel Rails.—Only moderate lots of Standard Steel Rails are being sold. The much talked of Pennsylvania contract for 50,000 tons has not yet made its appearance in the market. Low prices continue to be made on Light Rails.

Cast Iron Pipe.—No large transactions were reported in this vicinity during the week. While small orders are fairly numerous, keeping the foundries well employed, no important lettings are in immediate sight. Prices continue as they have been. Competition is keen for quantities of any size, but carload lots are quoted at \$28 per gross ton for 6 to 10 inch and \$27 for 12-inch upward, at tidewater.

Finished Iron and Steel.—Most of the business now coming up in the structural line covers building construction. The Trinity Building has been placed under contract, taking 3500 tons. The new building for the College of the City of New York, which will require \$500,000 worth of structural and ornamental iron work, has also been awarded. The Hotel Brunswick is coming forward again and may soon be ready for bids, requiring from 5000 to 7000 tons. Quite a number of small buildings have been placed and others are taking shape. Considerable structural work in the West is also expected to develop into contracts very shortly. Capitalists are now beginning to think that it is good business judgment to put through long contemplated building projects. Prices on finished work are so much lower than they have been that they are regarded as inviting. Prospects are very much brighter in this city, and it is hoped that the unimportant labor dispute now distracting the building trades will be quickly settled, so that the revived interest in building may not suffer any setback. A few bridge jobs have been secured by the American Bridge Company, but they are unimportant. Among these are a 1200-ton bridge in Massachusetts and an 800-ton bridge for a Western road. The New York, New Haven & Hartford Railroad Company are asking bids on a 1500-ton bridge. Inquiries for Plates are fair, but the past week has not been marked by the closing of much business in this territory. Nevertheless, the Eastern Plate mills are reported to be comfortably supplied with work. The local labor unions are now opposing the attempt to have the municipal eight-hour law modified, and it is probable that some of the new city ferry boats for New York may be built outside of the city. Bar Iron is active. Good orders are being placed freely. Among the most notable was one for 2500 tons for immediate delivery and 2000 tons per month for five months at full figures. Manufacturers are talking of the probability of an other advance. We quote, at tidewater, as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Common Bar Iron, 1.35c. to 1.40c.; Refined Bars and Soft Steel Bars, 1.49½c.

Old Material.—The special feature of the past week has been the remarkable increase in the demand for Re-rolling Steel Rails. Inquiries are being received here from distant points and prices have sharply advanced. A much better demand is also observed for melting stock and for material ordinarily used by rolling mills. The rolling mills drawing on local stocks have, in fact, found it so difficult to get what they need that they are applying to factories as far West as Ohio in the hope of being able to pick up a better supply. Prices are now quoted as follows per gross ton, New York and vicinity:

Old Iron Rails.....	\$16.50 to \$17.00
Old Steel Rails, long lengths.....	15.50 to 16.00
Old Steel Rails, short pieces.....	12.00 to 12.50
Relaying Rails.....	17.00 to 18.00
Old Car Wheels.....	12.00 to 12.50
Old Iron Car Axles.....	18.50 to 19.00
Old Steel Car Axles.....	14.50 to 15.00
Heavy Melting Steel Scrap.....	12.00 to 12.50
No. 1 Railroad Wrought Iron.....	15.50 to 16.00
Iron Track Scrap.....	14.50 to 15.00
Wrought Pipe.....	10.50 to 11.00
Ordinary Light Iron.....	7.50 to 8.00
Cast Borings.....	5.50 to 6.00
Wrought Turnings.....	8.50 to 9.00
No. 1 Machinery Cast.....	12.00 to 12.50
Stove Plate.....	10.00 to 10.50

Metal Market.

NEW YORK, March 23, 1904.

Pig Tin.—The Tin market has experienced a series of sharp advances, both here and in London, during the week under review, due to bull manipulation abroad. While showing activity at the close of last week, with spot transactions amounting to several hundred tons, the market has quieted down considerably in the past few days. Domestic consumers are understood to be fairly well supplied for near future requirements, through recent purchases, and the high price of the metal now ruling deters further buying, except in a hand to mouth way. The market at the close was quiet, but very firm, with prices as follows: Spot and March, 28.85c. to 29.12½c.; April, 28.50c. to 28.85c. The London market has advanced to £130 2s. 6d. for spot and £130 for futures. Arrivals so far this month have aggregated 2971 tons, and the metal afloat is estimated at 3182 tons.

Copper.—A material accession of strength on the other side and continued heavy exports of Copper have combined to stiffen the market here. Domestic consumers are showing rather more interest, but orders from home sources are still below the average. The lack, however, is offset by the very large export business, which amounts to 15,500 tons so far this month and is expected to reach 20,000 or 21,000 tons for the whole of March. Prices to-day closed at 12¾c. to 13c. for Lake, 12¾c. to 12¾c. for Electrolytic, and 12¾c. to 12¾c. for Casting Copper. The London market has advanced to £58 for spot, £57 12s. 6d. for futures, and £61 for Best Selected.

Pig Lead.—Is steady and unchanged, with a fair demand for spot, which is somewhat scarce and is quoted at 4.60c. to 4.65c., from store. The quotations of the American Smelting & Refining Company are still based on 4.50c. for 50-ton lots of Desilverized, shipment within 30 days. St. Louis telegraphs 4.40c. to 4.42½c., and London cables an advance to £12 5s.

Spelter.—This metal is a shade higher, with fair demand and light offerings of spot. The market closed firm at 5.05c. to 5.15c. for spot, while St. Louis quoted 4.80c. and London has declined to £21 17s. 6d.

Antimony.—The market is firm and unchanged. At the close to-day Cookson's was quoted at 7¼c. to 8c.; Hallett's at 7¼c. to 7½c., and other brands at 6¼c. to 6½c.

Nickel.—This metal is firmly held, with the usual volume of business passing. Large lots are quoted at 40c. to 45c., and smaller quantities at 50c. to 60c.

Quicksilver.—The tone of the market is steady. Flasks of 76½ lbs. are quoted at \$47 to \$47.50. London quotes £8 5s.

Tin Plate.—The demand for Tin Plate has improved materially and is now quite active. Some heavy contracts have been placed in the past week or two with the leading producer, and most of the independent mills are reported to be filled up with orders for 30 to 60 days ahead. The American Tin Plate Company are declining orders for delivery before May. At the same time, it is known that heavy stocks of Plates have been piled up in view of the possibility of a strike at the mills when the wage scale expires. Such action on the part of the men is thought to be unlikely, however, the Amalgamated Association having shown a disposition to meet the employers half way in the matter of wage reduction. Meanwhile prices are very firm and an advance would not surprise the trade, especially in view of the high price of Pig Tin. Quotations are unchanged on the basis of \$3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to \$3.64, New York. Welsh Plates have advanced 3 pence to 11 shillings 4½ pence per box, f.o.b. Swansea.

The Midvale Steel Works, Nicetown, Philadelphia, have filed plans with the Bureau of Building Inspection of that city for a 231 foot extension to their open-hearth plant. This when completed will make the dimensions of that building 230 x 188 feet. Runways for 25, 75 and 150 ton cranes will be installed in the new building.

Last week the Craig Shipbuilding Company, Toledo, Ohio, launched their one hundredth vessel. The vessel was the side-wheel passenger steamer "City of Benton Harbor," for the Graham & Morton Transportation Company, Chicago. She is 265 feet long and 65 feet wide over all, and her engines have a capacity of 3000 horse-power, making her one of the speediest passenger boats on the lakes.

B. M. Gardner, Iron and Steel broker, room 541, The Rookery, Chicago, has been made sales agent in Chicago territory for the Pittsburgh Steel Foundry, manufacturers of Steel Castings from 50 lbs. to 50 tons in size, Steel Rolls, electrical work of special mixture, binding machinery, railroad work and Heavy Ingots in Acid Steel for forging purposes.

Mexican Railway and Industrial Notes.

The Tariff and Imports of Iron and Steel.

DURANGO, March 14, 1904.—The higher rates of duty upon imports of iron and steel, which will shortly come into effect, have caused importers to send rush orders for material, in the hope of receiving shipments before the expiration of the time during which the old rates apply. Although the increase under the new schedule is considerable in many instances, particularly with respect to iron and steel rails, which hereafter will be assessed at \$10 per ton, it is not probable that the imports of foreign manufactured iron and steel products will be materially checked for a long time to come, the existing facilities for supplying the home demand being far from adequate. The encouragement, however, which the new law gives to Mexican industries will be of substantial benefit to them and is well in line with the policy which has resulted so advantageously to kindred lines in the United States.

The principal English daily paper published in the capital has the following comments upon the new decree, which are quoted to show the trend of local sentiment in the matter:

The trade of the United States and some other foreign countries with Mexico will be affected by these new tariff schedules, but it must not be forgotten that if Mexico has turned her attention to the building up of her home manufacturing industries the American Congressmen who, some 20 years ago, contumeliously rejected the Grant-Romero reciprocity treaty, are originally responsible for that movement, which must to a certain extent curtail the trade of the United States with Mexico, though that trade is so natural and so vigorous that, if checked in certain directions, it will expand ultimately in others. The commercial exchanges between the two countries are bound to be large and mutually beneficial. On the other hand, it is not improbable that in certain lines of manufactured goods (in protecting which Mexico is but taking a leaf from the book of her northern neighbor) this country will ere long be competing with the United States in foreign markets, particularly the markets of Central and South America.

The halcyon days which the patriotic editor has in his mind's eye seem a long way off, but as there must be a beginning to everything—and the Mexican iron and steel trade has made a very fair beginning—it is not safe to cast doubt even upon gratuitous prophecy. In the meantime, under the new conditions governing the export trade to this country, it behooves United States iron and steel manufacturers to make a vigorous effort to retain the business which they have built up, by adopting such means to offset the additional burden as they are best able to determine.

Imports from Europe and the United States.

A comparative exhibit showing the annual value of the imports of merchandise from the three countries with which Mexico has the most important trade relations reveals some interesting facts. The most significant is the steady increase in the volume of trade with Germany. That country, which occupies the third place in the list, is far outstripped by the United States, as may naturally be supposed, but is fast overtaking Great Britain, which comes second, and whose annual total for the past five years has been almost unchanged, despite the active exploitation which this country has undergone during that period.

The total value, in gold, of the imports from Germany in the fiscal year 1898-1899 was \$5,677,925; within a space of five years it has almost doubled, the aggregate gold value of merchandise imported from that country in the fiscal year 1902-1903 being \$9,574,008, the increase year by year being remarkably steady and regular. In the fiscal year first named Mexico imported from Great Britain goods to the value of some \$9,000,000; in the year 1902-1903 the total had increased to a little over \$10,500,000, but there was a marked decrease in the total for the year preceding. There seems to be no gainsaying the fact that the United States and Germany are crowding Great Britain out of this market in the sales of hardware, mining machinery and structural material, while in other lines, such as textiles, Mexico is now to a great extent supplying her own needs independent of Manchester, which used to furnish so much of her cottons and cloths. Imports from the United States have increased

at about the same rate relatively as in the case of Germany, their total value having nearly doubled in the last five years, the figures being in 1898-1899, \$24,164,687, and in 1902-1903, \$40,514,545.

Railway Construction and Concessions.

The contract of partnership existing between the Mexican Government and the London contracting firm of S. Pearson & Son, Limited, has been amended and amplified, the partnership capital being increased from \$5,000,000 to \$7,000,000, Mexican silver. Under this contract the firm named are engaged in the reconstruction of the National Tehuantepec Railway, now nearly completed, and in making extensive improvements in the harbors at the terminal ports.

A concession has been granted to the Merida & Peto Railway Company of Yucatan for the construction of a branch line of railway from Hunabashen to Teabo. The construction must be finished within six years, 8 km. being the distance required to be completed the first year, and at least 10 km. each succeeding year until the time limit expires.

A company of Mexican capitalists have been formed with the object of constructing a railway from the Tuxtias, in Vera Cruz, to one of the existing systems, the starting point being Saltabarranca, thence to San Andreas Tuxtla. The line will traverse a rich tropical country which has long felt the need of modern transportation facilities.

A project is on foot to build a railway from Culiacan, the capital of the State of Sinaloa, to Topia, in the State of Durango, the originators of the enterprise being capitalists of Sinaloa.

The Esperanza Coal Company of the State of Nuevo Leon purpose constructing a line from their mines to connect with the International Railway, the distance being 40 km.

Work of construction is being actively pushed upon the Tabasco Central Railway, a force of about 300 men being at work upon the first section.

Six miles of aerial tramways are to be constructed from the Cigarrero mine to the Mexican Central at Jimulco station. The contract has been given to the A. Leschen & Sons Rope Company, St. Louis, Mo.

The tramway system of the city of Vera Cruz is to be changed to electric traction and extended by the firm of S. Pearson & Son, who control it.

A system of tramways is to be introduced in the town of Jiquilpan, Michoacan, and to be extended to the neighboring municipalities of Sahuyo and Palma.

The first instance of the application of electricity as a motive power upon one of the principal railway systems of Mexico will soon be recorded if the present plans of the Mexican Railway Company are carried out. Application has been made by this company for leave to establish a power plant at the waterfall on the river Atoyac for the generation of electricity to be used in moving their trains up the heavy grade at Las Cumbres de Maltrata. It is reported that this company will construct an electric line between the cities of Puebla and Vera Cruz, using power from the same source.

Industrial Notes.

The firm of Phillip G. Roeder & Co., manufacturers' agents, of the City of Mexico, have been dissolved, the business having been consolidated with that of the National Metal Company, the department being in charge of Mr. Roeder as manager.

Plans are well advanced for the construction of a water works and drainage system for the city of Monterrey. The contract for the work is in the hands of Mackin & Dillon, an American firm, who also have the contract to construct a water supply system for the city of Torreon.

Imports for the first five months of the fiscal year 1903-'04 reached the total of \$29,987,601.48, gold value, compared with \$30,192,319.18 in the corresponding period of the last fiscal year. The value of the exports in the same months of the present fiscal year was \$86,276,153.96, silver, against \$74,799,388.78 in the first five months of 1902-'03.

J. J. D.

HARDWARE.

THE long series of meetings of State associations of the retail Hardware merchants of the country finds a fitting culmination in the meeting of the National Retail Hardware Dealers' Association, which is at this time in session in Indianapolis. This organization, as our readers are aware, is a representative body made up of delegates from the various State associations, and while necessarily limited in numbers is exceedingly influential as the representative of something like 5000 Hardware merchants organized for the consideration of trade questions, with an especial view to their protection and welfare. The delegates are, as a rule, from among the prominent and most enterprising members of the various associations, who thus bring to their deliberations ability and breadth of view, together with the special personal qualities which make for success and leadership in business affairs.

Much of the work done by the National association is naturally of an executive character, relating to the practical working of the organization and the advancement of the interests of the retail merchants in various ways. Holding an important place in this work is the consideration of measures which can wisely be adopted to correct existing abuses and defend retail merchants from competition from jobbers and manufacturers which they should not be called upon to meet. This endeavor calls for care and something of a judicial temper, and the retailers are to be congratulated that they have grappled with these troublesome questions in so temperate, and even conservative, a fashion. They have thus far succeeded in conducting their campaign with some measure of success, without awakening any general antagonism on the part of manufacturers or jobbers. Their efforts have commended themselves to the calm judgment of the trade as reasonable and just.

The retail movement is apparently still in its infancy, and it remains to be seen whereto it will grow. It is already sufficiently strong to command the respect of the entire trade. It is, indeed, safe to say that neither manufacturers nor jobbers will be disposed to treat lightly any deliverances made by the National, or even by a single State Association. The movement has become the recognized voice of retail merchants, giving them an opportunity which they never had before of making known their views and defining their position on trade questions and methods directly affecting their interests. The attention, too, which is given to the cultivation of correct business methods as well as the development of fraternal relations invests the movement with additional dignity and importance, and makes it contribute directly to the advantage of those identified with it, and tends, indeed, to elevate the general tone and character of the Hardware trade. The benefits resulting should thus be found all along the line from the stores of the merchants through the various channels and avenues of distribution, reaching even in some ways to the manufacturers and the manner in which their goods are put on the market.

It is to be hoped that as the organized retail interests realize more and more the position which they occupy, the consciousness of their power, which, after all, has its serious limitations, may not lead them to arbitrary or dictatorial methods, but induce them rather to pursue in all matters a considerate and even conservative course, preferring to err on the side of moderation, and recognizing always the rights and privileges of others, even in

the presence of practices which from their point of view are subject to criticism. By the consistent following of this principle they will commend themselves more and more to the best judgment of the trade, and be able to build up a strong and enduring structure on the foundations which have been laid. In view of the importance of the issues involved the proceedings of the meeting of the National Association, a report of which up to the time of our going to press is contained in the following pages, will be read with interest.

Condition of Trade.

Manufacturers' orders, while not especially heavy, are generally referred to by them as indicating a fair condition of things among the merchants throughout the country. Most of them report an increased activity within the past two or three weeks, as both jobbers and retailers are purchasing in quantities sufficient for their early needs. Much energy is shown in the marketing of goods, and the army of traveling salesmen is largely and actively engaged in cultivating trade. It is evidently more necessary than heretofore to make effort to market goods, and this tends to increase the traveling force, especially on the part of manufacturers, some of whom are permitted the old time experience of having goods in warehouses awaiting sale. This luxury, as they would have been disposed to regard it in the recent long continued period when they were far behind their orders, is not now altogether to their liking and there is consequently the putting forth of vigorous efforts to secure trade. This leads to concessions in price in some lines and slightly lower quotations are thus creeping in. In others, however, there is steadiness and even strength. The general tone of the market does not forbid buying for the requirements of the next few months. Jobbers are pretty aggressively looking for business and the time honored practice of making leaders of certain goods has not disappeared. It is quite noticeable, too, that manufacturers are reaching out more aggressively for orders, and leading merchants among the retail trade report more frequent calls from their representatives.

Chicago.

The heavy precipitation of snow and rain during the last two or three weeks and the disastrous floods which have accompanied it have served to interrupt the steady demand for spring and summer lines. Notwithstanding this temporary setback, the Hardware business in general in the West may be said to be good. Advances in prices are noted in a number of lines, including Hammers, Wringers, Carriage Bolts and Machine Bolts. Notice has been received by local jobbers that a number of changes may be made in the discounts on Hatchets and Axes, beginning April 1, and the general opinion is that these changes will involve an advance averaging 25 cents per dozen. Painted Wire Screen Cloth is now held at \$1.25 per 100 feet by all the leading Western jobbers, and some holders are asking \$1.30. On the other hand, there is a disposition on the part of some of the smaller jobbers to cut the price to \$1.20 where necessary to get business, although the supply of Cloth held by firms of this kind is so small as to have no serious effect on the market at large. Garden Tools are active in demand, particularly in Southwestern territory. Builders' Hardware is quiet, because building operations are delayed on account of the impossibility of laying foundations, partly owing to the wet condition of the ground and partly for the reason that many building operations are delayed until a more definite understanding of the labor situation is possible. This will be a banner year in Lawn Mowers with leading Chicago jobbers, and there is a possibility that the demand may exhaust the supply before the season is closed. Wire Nails and Wire products have suffered no diminu-

tion in their demand, which bids fair to surpass the supply, and the mills are already from three to six weeks behind their orders. Cut Nails are scarce just now in this market, as jobbers have refrained from laying in large stocks until they were sure of the position of the Nail makers. An unpleasant feature of the Cut Nail market is the fact that Steel Nails are shipped on orders that definitely require Iron Nails, the only difference between the Steel and Iron being the wording on the top of the keg, and customers are forced to pay 10 cents per 100 pounds advance for the name "Iron" on the top of the keg. This is not a universal practice, but it is indulged in to an extent to warrant mention here. As a matter of fact, the actual supply of Iron Nails is far short of the demand.

NOTES ON PRICES.

Wire Nails.—The largest producers are falling behind their deliveries, and this with delays in transportation is causing inconvenience to the trade. Demand continues heavy, being larger in volume than the mills can conveniently handle. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95
Retailers, less than carload lots.....	2.05

New York.—There is a moderate demand from the city trade with a larger volume of business from tributary territory. The possible recurrence of last summer's strike conditions in the building trades is not at all encouraging to local merchants. Quotations are as follows: Single carloads, \$2.10; small lots from store, \$2.20.

Chicago, by Telegraph.—The consumption in the city of Chicago itself is below normal, but the demand from the West and Southwest generally is excellent, so much so that mills are already experiencing difficulty in meeting the wishes of their customers in point of delivery. Quotations are as follows: Carload lots to jobbers, \$2.10 per 100 pounds; less than carloads to jobbers, \$2.15 per 100 pounds; carloads to retailers, \$2.15 per 100 pounds; less than carloads to retailers, \$2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—Demand for Wire Nails continues heavy and the mills are being swamped with business. The car situation is very unsatisfactory and the mills are utterly unable to get cars fast enough to move their product. Unless the supply of cars soon gets better it may be necessary before long to shut down a number of mills until present stocks of Nails have been shipped out. There is some talk of a further advance in prices, but nothing official has been given out. The tone of the market is very strong. We quote Wire Nails at \$1.90 in carloads to jobbers, \$1.95 in carloads to retailers and \$2 to \$2.05 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—The trade are looking forward with considerable interest to the result of the meeting of the Cut Nail Association, to be held this week. During the month of February the mills sold more Nails than they made and it is not unlikely that similar conditions will rule for March. The position of the raw material market is much stronger than on January 7, when a reduction of 20 cents per keg was made in price. Steel is scarce and conditions generally would appear to justify an advance. It is not at all certain what action will be taken at the meeting. The market is steady at the following quotations for Steel and Iron Nails, in all quarters: \$1.70, base, in carloads, and \$1.75 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

Later.—As we go to press we learn that the price of Cut Nails has been advanced 5 cents per keg, making the base price in carloads \$1.75, f.o.b. Pittsburgh.

New York.—The local demand is moderate, and the market firm. Quotations are maintained as follows: Carloads on dock, \$1.84½; less than carloads on dock, \$1.92½; small lots from store, \$2.

Chicago, by Telegraph.—Prices are unchanged, and the demand all that could be expected. We quote both Steel and Cut Nails, to jobbers, carload lots, \$1.86½, base, Chicago; less than car lots, \$1.91½, base, with the understanding that consumers and retailers are to be charged 10 cents advance over these prices. Jobbers are charging \$2.10, base, from store in small lots.

Pittsburgh.—Demand seems to be improving, and the Cut Nail mills are entering more orders than for some time. At the coming meeting of the Cut Nail Association it is not improbable a slight advance in prices may be made. The tone of the market is firm. We quote Steel and Iron Cut Nails at \$1.70, base, in carloads, and \$1.75 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The heavy demand continues, the volume of business being so large that mills find difficulty in making shipments promptly. The lack of car supply adds to the difficulty in shipping in accordance with purchasers' requirements. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago, by Telegraph.—The remarkable extension in farming operations in the South and Southwest is leading to an unusually large demand for Barbed Wire Fencing, a demand which requires the utmost producing power of the mills to supply. Prices remain unchanged. Quotations are as follows: Carload lots, Painted Wire, \$2.40; Galvanized, \$2.70; to retailers, carload lots, Painted, \$2.45; Galvanized, \$2.75; to retailers, less than carload lots, Painted \$2.55; Galvanized, \$2.85; Staples to jobbers, \$2.25 for Plain and \$2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—Demand continues heavy and the mills are way behind in deliveries, both on account of heavy business and shortage of cars. Prices are very firm and are being rigidly held. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads	\$2.20	\$2.50
Retailers, carloads	2.25	2.55
Less than carloads.....	2.35	2.65

Smooth Fence Wire.—Mills are behind on orders to such an extent that some are refusing to book some kinds of orders. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days: Jobbers, carloads \$1.80
Retailers, carloads 1.85
Less than carloads..... 1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55	
Galvanized....\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago, by Telegraph.—It is not unlikely that prices on all Wire products will be advanced again before long, as the mills are already in a position where they are turning away business they do not consider desirable. Quotations are as follows: Smooth Fence Wire, sizes 6 to 9, \$2 per 100 pounds, in carload lots, to jobbers, f.o.b. Chicago; \$2.05 per 100 pounds to retailers in carload lots, and \$2.10 in less than car lots.

Pittsburgh.—A heavy demand, noted in these reports for some weeks, shows no abatement, and the mills have all the business they can take care of and more. The car supply is bad, and is interfering seriously with shipments. The recent advance in prices has not interfered with demand, but on the contrary has stimulated it, as the trade believe another advance may be made before long, as the tone of the market is very strong. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, \$1.80, base, for Nos. 6 to 9, in carloads to jobbers, and \$1.95 to \$2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

The Holt-Lyon Company.—The Holt-Lyon Company, Tarrytown, N. Y., quote their Cleaner Rug and Carpet Beaters at the prices named below:

No. 12, Wire, Coppered, width 9 x 10 inch, length 28 inch	Doz. \$0.85
No. 12, Wire, Tinned, width 9 x 10 inch, length 29 inch	1.00
No. 11, Wire, Coppered, width 9 x 10 inch, length 32 inch	1.10
No. 11, Wire, Tinned, width 9 x 10 inch, length 32 inch	1.20
No. 10, Wire, Galvanized, width 10 x 14 inch, length 36 inch	1.75

Axes and Hatchets.—Intimations have quietly been given out that an advance in Axes and Hatchets will take place April 1. The general impression is that the advance will be 25 cents per dozen.

Steam Gauges.—A good deal of irregularity has recently been developed in the market for Steam Gauges and lower prices are prevailing.

Cordage.—The continued postponement of spring weather has affected demand to some extent, the volume of business not being quite as large as earlier in the month. Quotations on the basis of 7-16-inch diameter and larger are as follows: Pure Manila, 12 cents per pound, with a rebate of $\frac{1}{4}$ to $\frac{1}{2}$ cent per pound to largest buyers; other grades of Manila, 10 to 11 cents, according to quality; pure Sisal, $9\frac{1}{4}$ cents, with $\frac{1}{4}$ cent rebate to largest buyers; Mixed Sisal, 8 cents per pound, with no rebate.

Paris Green.—There is a lull in demand, practically no orders being received by manufacturers. It is estimated that contract orders for perhaps half of the probable requirements for the season have been booked. The base quotation of 11 cents in Arsenic kegs or casks, is general. Most manufacturers are asking the customary advances, but some are naming less than the regular advances on the smaller packages.

Glass.—A new scale of wages was recently announced by one of the Window Glass workers' organizations, being a reduction of 25 per cent. from the Philadelphia scale. A paper devoted to Glass interests remarked as follows on this reduction in wages: "What effect this cut in wages will have on the market remains to be seen. It does not, however, warrant any reduction in the price of Glass, since, as a rule, factories have been working under special scales—market money only—and the change will increase rather than decrease the labor cost. The only advantage in it is that it furnishes a basis for calculation, which has heretofore been impossible under the diversity of wage agreements in existence." It is believed that the new scale will be generally adopted. Local jobbers are buying only what they need for nearby requirements, at somewhat higher prices than they have been willing to pay heretofore. In fact, the Eastern market shows more strength than that of the West, from the manufacturers' standpoint. One Eastern factory has refused to sell at less than 90 per cent. discount from the manufacturers' list of January 1, 1901, thus putting it virtually out of the market for the present. At this factory the Sheet Glass, as made, is being stacked, so that sizes can be cut to fill orders when prices reach the company's ideas. Other factories, who are obliged to get quick returns from their output to keep their plants in operation, are quoting from 90 and 5 to 90 and 10 per cent. discount, according to territory. It is reported that the directors of the Independent Window Glass Company decided upon a 5 per cent. in price advance, to take effect March 21. The view is expressed that Glass will probably be scarce by September, as the run will now be short, lasting only until June 1, and that only about 1500 pot capacity is in operation out of about the 4000 pot capacity of the country.

Oils.—*Linseed Oil.*—Condition of dullness, which has characterized the market recently, continues prominent. Demand is very light, and for small lots. Quotations are as follows: City Raw, in lots of five barrels or more, 42 cents; in lots of less than five barrels, 43 cents per gallon; State and Western Raw, 39 to 41 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—The week under review has shown that the trade has no disposition to anticipate their wants on a declining market. Business is restricted to present wants and a hand to mouth policy is pursued.

Quotations, according to quantity, in this city are as follows: Oil barrels, $60\frac{1}{2}$ to 61 cents; machine made barrels, 61 to $61\frac{1}{2}$ cents.

PENNSYLVANIA WHOLESALE HARDWARE SUPPLY ASSOCIATION.

THE annual meeting of the Pennsylvania Wholesale Hardware and Supply Association was held on the 16th inst., at the Hotel Savoy, New York City. The following members were present:

C. E. Morgan, C. Morgan's Sons, Wilkes-Barre.
George W. Lewis, Phelps, Straw & Co., Wilkes-Barre.
William H. Conyngham and William Stout, Pennsylvania Supply Company, Wilkes-Barre.
G. Howard Bright, Bright & Co., Reading, Hazleton and Pottsville.
John H. Obold, J. H. Obold & Co., Reading.
A. B. Stein, Stichter Hardware Company, Reading.
A. Raymond Bard, Bard Hardware Company, Reading.
J. M. Kammerer and W. E. Bittenbender, Bittenbender & Co., Scranton.
F. W. Shear and Ralph E. Weekes, Foote & Shear Company, Scranton.
W. H. Taylor, Scranton Supply & Machinery Company, Scranton.
H. L. Raub, Reilly Bros. & Raub, Lancaster.
Henry S. Franklin and George S. Franklin, Steinman Hardware Company, Lancaster.
F. W. Beckley, Hazleton Machinery & Supply Company, Hazleton.
George D. Krause, George Krause Hardware Company, Lebanon.
H. G. Dreisbach, C. Dreisbach's Sons, Lewisburg.
W. W. Welliver, Welliver Hardware Company, Danville.



C. G. McCORD, Secretary.

The following officers were elected for the coming year:

PRESIDENT, William H. Conyngham, Wilkes-Barre.
FIRST VICE-PRESIDENT, H. G. Dreisbach, Lewisburg.
SECOND VICE-PRESIDENT, A. J. Roat, Kingston.
SECRETARY, C. G. McCord, Reading.
TREASURER, G. Howard Bright, Reading.

The Executive Committee appointed by the president comprises George W. Lewis, H. L. Raub, George D. Krause, F. W. Beckley and W. W. Welliver, who will act in conjunction with the Advisory Committee, which is made up of those members who have served the association as president.

The usual annual dinner was enjoyed with the following guests present: George H. Sargent of Sargent & Co., Henry R. Towne of Yale & Towne Mfg. Company, R. R. Williams, Hardware Editor of *The Iron Age*, T. B. Coles of the American Steel & Wire Company, F. W. Baker, Jr., of the American Axe & Tool Company, A. S. Bailey of E. C. Atkins & Co., C. F. Reichner of George Griffiths Company, T. J. Fernley, secretary of the National Hardware Association, W. S. Wolf of the Reading Hardware Company, B. S. Alder of New York City and E. T. Fraim of Lancaster, Pa. Interesting addresses were made by Messrs. Sargent, Towne, Williams, Fernley, Baker, Taylor and Kammerer, Mr. Kammerer acting as toastmaster.

The unanimous opinion expressed by the members was that this was the most successful meeting ever held by the association.

TWELFTH ANNUAL MEETING OF THE HARDWARE CLUB.

THE twelfth annual meeting of the members of the Hardware Club was held at the club, Saturday, March 19, this being the tenth year of the occupation of the club's quarters. The following governors were elected to serve three years, viz.: Alfred D. Clinch, Terence F. Curley, James D. Foot, Henry L. Freeland and Francis B. Griffin, the two latter being new members of the board; Webster R. Walkley declining a re-election as a governor, Joseph Gales was chosen a governor to serve one year.

The president of the club, R. R. Williams, in presenting his report for the year made the following address:

ANNUAL REPORT OF THE PRESIDENT.

To the Members of the Hardware Club.

At this, our twelfth annual meeting, there are substantial reasons for congratulation on the position and prosperity of the club. Its notable success during all its previous history has been continued during the year which has closed, and under very favorable auspices we come together to review the record and take such action as may in your judgment be called for to secure its uninterrupted and, if may be, enlarged usefulness and well-being.

It is certainly a matter for special congratulation that after the preliminary work of organizing and installing the club in its present quarters was accomplished, there has not been a serious difficulty or solicitude connected with its administration. With a prosperous financial condition, the income of the club being sufficient for its needs, there has been an admirable spirit of loyalty and fraternity among the membership, which has contributed not a little to the success of the club and also to the pleasure resulting from identification with it.

Substantial evidence of the club's prosperity is given in the official reports of the secretary and treasurer, to which you will have the pleasure of listening. From the facts which they will bring before you, compared with those presented in the last annual report, you will learn that there is now a larger membership and a longer waiting list than at the beginning of the year; that during the year there has been an increased income from profit on sales, from dues, from admission fees and from the interest account. The financial condition of the club is thus seen to be eminently satisfactory. This is the case, notwithstanding the policy which has been pursued of keeping up its equipment to a high standard, including the purchase of about \$2000 worth of pictures; but for these and other particulars concerning the club I refer you to the detailed reports of the other officers.

Changes in the membership are constantly occurring, owing to the various causes which operate in the business life of the metropolis. We are thus called upon from time to time to regret the departure of those who have been identified with us in the enjoyment and companionship of the club. New members, too, are constantly coming in to receive the cordial welcome which is extended and to take their part in its pleasures and responsibilities. The details of these changes will be given by the secretary, who will remind you that during the year we have been called upon to mourn the loss by death of ten of our number. Of these Mortimer C. Ogden was one of the charter members of the club, a member of the board of governors, and an active, faithful and honored official. He and the others whose taking off we are required to chronicle will be held in kindly memory. The interruption of these personal relations and the severance of these ties remind us how much worth there is in those with whom we are associated in the intercourse of business life, and impress upon us a recognition of the privilege which remains in the companionships and friendships which are still permitted. In touching upon this I am, perhaps, going beyond the line of formal official duty, but reminding you of the service rendered by the club in promoting these amenities of business life and in cultivating some of the finer traits of our nature, I venture, and without any misgiving, to express the hope that in enlarging measure these higher ends may be attained, as the result of your wisdom and loyalty in directing its affairs and the spirit in which you carry on its work and enjoy its privileges.

Secretary's Report.

The report of the secretary, A. G. Sherman, contained a brief review of the year and several interesting facts connected with the club's history. Since the organization of the club a total of 1309 members have been admitted. The resident membership limit of 600 was reached about

four years ago, and since that time there has been a constant waiting list, amounting now to 52. The nonresident membership limit of 200 has not yet been reached, but there are 175 members of that class. During the past club year ten members have died, a smaller club mortality than for several years. Two-thirds of the members are connected with the Hardware or related trades.

Treasurer's Report.

An interesting detailed report was made by Thomas F. Keating, the treasurer of the club, indicating a very satisfactory financial condition, the gain for the year having been over \$2000.

BUILDERS' HARDWARE AND RETAIL HARDWARE MERCHANTS.

AT the recent meeting of the Connecticut State Association of Retail Hardware Dealers the interference with the trade of retail merchants by the manufacturers and jobbers who sell direct to consumers was one of the subjects discussed. The condition of the trade in Builders' Hardware called out many criticisms from the merchants, who, on account of the methods pursued by the manufacturers of this line of goods, find it difficult and unsatisfactory to handle this line. Among the grievances alluded to was the direct competition of the manufacturers in connection with contract work. Some complaint also was made in regard to similar conditions applying to Screws. A committee consisting of D. N. Clark, Shelton; F. T. Terry, Ansonia, and George J. Bassett, New Haven, was appointed to draft resolutions expressive of the sense of the convention. These resolutions are given below. They will be read with interest by Hardware merchants in all parts of the country, most of whom experience similar difficulties. The resolutions on this subject are as follows:

RESOLUTIONS.

Whereas, The methods pursued in the sale of Builders' Hardware and Screws render the handling of these important lines difficult, and in many cases unprofitable to the retail Hardware merchants, who should be the channel through whom this class of goods are obtained by the owners or contractors of buildings; and

Whereas, Under the stress of competition the Hardware merchant is frequently obliged to compete, not only with the jobbers but also with the manufacturers, in the sale of these goods; and,

Whereas, The manufacturers of Builders' Hardware and Screws are now working together harmoniously in the maintenance of prices and in general control of the market, and are thus probably in a position to take concerted action with a view to correcting iniquities which have developed in the trade; be it

Resolved, That we respectfully bring this matter to the attention of the manufacturers and ask them to devise, if possible, some remedy for the existing condition of things, which is, we are sure, unsatisfactory both to them and to us, so that the sale and distribution of Builders' Hardware and Screws shall be left to the retail Hardware merchants, to whom it is acknowledged to belong, except in localities where there are no Hardware dealers able to distribute such goods.

THE HOERLE MFG. COMPANY.

THE HOERLE MFG. COMPANY of Pittsburgh have been organized with a capital of \$100,000. Their factory is located in the Eagle Power Building, Allegheny, Pa. The concern propose to manufacture a number of specialties, including Carpet Stair Fasteners, Improved Telephone Desk Pads, Potato Parers, Tack Pullers, Exercising Machines, and a general line of Dies, Tools and small Machines. The offices of the concern are in Room 308, Frick Building, Pittsburgh.

Tolsom Hardware & Implement Company, Fayette, Mo., have been succeeded by Dale Hardware & Implement Company, comprising M. J. Dale of Kirksville, J. W. Perry of Leonard and Geo. W. Robertson of Mexico. Mr. Dale was for a number of years identified with the Hardware and Implement business, but latterly has been representing a Plow manufacturer in Northern Missouri.

National Retail Hardware Dealers' Association.

(By Telegraph.)

THE fifth annual convention of the National Retail Hardware Dealers' Association was begun in the Palm Room of the Claypool Hotel, Indianapolis, Ind., at 10.30 a. m. Tuesday. As with previous national conventions of the association, this body was composed of delegates appointed by the various State associations on the basis of two delegates for the first one hundred paid members and one delegate for each additional one hundred or major fraction thereof. Fifty delegates were present at the first session, and this number was augmented at subsequent sessions by late arrivals.

The convention was called to order by W. P. Bogardus of Mount Vernon, Ohio, the president, with M. L. Corey of Argos, Ind., national secretary, at his post. The president announced that matters pertaining to interstate commerce had been referred to the Executive Committee, which would report later.

Unorganized States.

Much time was devoted to the discussion of ways and means for organizing dealers in States not yet having associations, and it was suggested that dealers in States not organized be invited to attend meetings of the associations in adjoining States. The matter was laid over for further discussion.

Committees.

The following committees were appointed by the chairman:

RESOLUTIONS.

S. R. Miles, Mason City, Iowa; James N. Kline, Williamsport, Pa.; H. J. Knapp, North Tonawanda, N. Y.; S. R. Fraser, Vinita, Ind. Ter.; C. N. Barnes, Grand Forks, N. Dak.

LEGISLATION AND BY-LAWS.

W. P. Lewis, New Albany, Ind.; H. L. McNamara, Janesville, Wis.; F. Neudorff, St. Joseph, Mo.; C. A. Hutspinpillar, Ironton, Ohio; A. H. Abbe, New Britain, Conn.

AUDITING.

A. J. Scott, Marine City, Mich.; W. S. Shacklett, Fulton, Ky.; D. H. Evans, Tracy, Minn.; C. E. Taylor, Little Rock, Ark.; Harry Hall, Lincoln, Neb.

NOMINATIONS.

E. M. Bush, Evansville, Ind.; W. H. Tomlinson, Le Sueur, Minn.; Frank A. Bare, Mansfield, Ohio; Dennis McLaughlin, Chicago, Ill.; F. C. Moys, Boulder, Col.

PRESS.

C. F. Ladner, St. Cloud, Minn.; C. A. Peck, Berlin, Wis.

President's Address.

The afternoon session opened with the president's address, in which President Bogardus reviewed the growth of various State associations and spoke of the importance of having at least one of the national officers present at each State convention, not only because it inspired the members of the associations to greater efforts, but that it permitted the shaping of those efforts along definite lines. The National Association, said he, representing as it now does the leading dealers in 18 States of the Union,

WIELDS A POWER NOT REALIZED

by the unobservant. Mr. Bogardus then briefly reviewed the work done by National officers before the National associations of jobbers and manufacturers at Atlantic City, and spoke for greater efforts for the up-building and encouragement of State and local associations.

MUTUAL INSURANCE.

Reference was made to the successful launching of the National Insurance Association and to the strength that the success of that movement was adding to both State and National dealers' associations. Members were urged to use their influence to overcome hostile insurance legislation that was being enacted by many State Legislatures under the guise of protection to the insured.

PARCELS POST LEGISLATION.

He urged members also to present a determined front in their stand against parcels post legislation, referring to Mr. Denny's House bill No. 7632 as the most dangerous because it proposed to appropriate \$100,000 for the installation of an experimental parcels post service in a thickly settled portion of the country, and if this could be made to appear successful it would be taken as a stepping stone to the adoption of the service all over the country, regardless of the greatly increased cost to the people due to the long hauls incident to sparser population in other territories. The whole parcels post legislation was characterized as being unjust, because it injured the many to benefit the few, and made both injured and benefited share in the cost.

He paid a tribute to the memory of Mr. Bock of Michigan, whose life and labors had been an inspiration to all.

In closing the president spoke eloquently of the judgment, wisdom, energy and faithfulness of Secretary Corey, and congratulated the association upon having so efficient an officer.

On motion by Mr. Ladner it was decided to publish the president's address in full in the next issue of the Bulletin.

Report of Secretary.

Secretary Corey delivered his annual report, in which he reviewed the work of the association during the year. The text of this report was of a confidential character, and its publication is withheld. The secretary warmly commended the National Jobbers' Association for the disposition they showed to stand firmly by the retailer and for the interest they had taken in the retailers' associations, and in the generosity of the hospitality of jobbers at various convention cities.

This report was also ordered published in full in the next issue of the Bulletin.

Catalogue House and Retail Prices.

L. Lindenberg of Dubuque, Iowa, delivered an address on the comparison of catalogue prices and retail prices, and this led to a general discussion which lasted an hour or more.

Reform in Manufacturers' Lists, Etc.

Sharon E. Jones of Richmond, Ind., read an important paper on the unfairness of many manufacturers' lists, discounts, terms and practices. Said he, in part:

Not many retail Hardware merchants have escaped the hardships and unfairness of the many arbitrary rules and regulations made by manufacturers and jobbers during the past few years, and the fact that members have not risen in open protest reflects their conservative, cautious policy in planning every move before they make it. Take first the matter of listing goods, or making price-lists. Some lists are subject to so small a discount that goods must be retailed at an advance over the list, and others are so

ABSURDLY HIGH

as to cause no end of confusion and unnecessary labor in figuring. Take, for instance, 8-ounce Upholstery Tacks, which are listed at \$1 per pound, and are today selling at 90, 50, 10, and another 10, if you must have it. Glass caps the climax of them all, with three different lists in about two years, and a threatened fourth, all subject to ridiculously large discounts. In fact, most of the common articles of sale in a Hardware store are smothered in figures and tied with many naughts, all to the great disadvantage of the retailer. I have inquired the reason for such

UNREASONABLE LISTS,

and have been repeatedly informed that lists are made high to make the retailer believe and the customer believe they are getting a low price by giving them a big discount, and I am sure this is true in no small sense, for I

have heard of the sale of goods by unprincipled salemen to ignorant or innocent purchasers at much more than their true value by taking advantage of high lists.

HIGH LISTS OFFER AN OPPORTUNITY FOR DISHONEST SALESMEN

to defraud the innocent buyers. They are full of opportunities for making mistakes in figuring discounts. They are time killers and brain paralyzers. They should be revised and lowered, so that no article should be listed at more than double the jobber's cost. This would allow for all the profit any one should have, and would save much time and prevent many errors.

ANOTHER EVIL

is that of making the lists so low that there is no fair margin of profit even when selling at list price. This is mostly found in specialties and Mechanical Tools, the very lines which should carry a liberal margin of profit to the retailer. The customer has been educated to expect a discount from every printed list, and can hardly be convinced that list price or even higher should be his purchasing price. Some manufacturers allow the jobber 10 per cent., and the retailer an additional 10 per cent., assuming that such profit is sufficient. We all know that no retailer can sell goods at 10 per cent. and make money aside from the most staple article.

THE AVERAGE COST OF CONDUCTING A RETAIL HARDWARE BUSINESS

is 15 per cent. of the gross sales, and yet there are few manufacturers or jobbers who provide for a margin of profit over this actual cost to the retailer. In short, the retailer is not considered by either the manufacturer or the jobber in the fixing of lists or discounts.

THERE IS INJUSTICE, TOO, IN THE TERMS OF PAYMENT on which goods are sold. Many goods are sold 2 per cent. discount from date of shipment, or net 30 or 60 days. Oftentimes goods cannot be delivered within the ten days, and the cash discount is forfeited, unless the purchaser is willing to risk payment for goods before they arrive. No man's money is worth 24 per cent. per annum for prepayment. Would it not be better for retailers to have their bills come net 60 days, with a proviso that should they be delayed in transit beyond the control of the consignee they should have the privilege of discounting on receipt of goods?

BOX AND CARTAGE CHARGES.

There is another practice that is full of unfairness, though in itself it seems trifling. I refer to charging for boxing and cartage. Some jobbers and manufacturers have long since waived these charges, but some still hold to them, and in many instances the charges are outrageous. I have seen boxing and cartage charges amount to from 5 to 10 per cent. of the face of the invoice. I have known of jobbers who remarked that they made enough off of boxing and cartage charges to defray all expenses of their department and make \$10 or \$15 per day besides. My advice is to refuse to pay boxing and cartage, and you will win out in most cases.

Relations of Retailer, Jobber and Manufacturer.

T. Frank Ireland of Belding, Mich., read a paper on the relations of manufacturer and jobber, in which he took the stand that the interests of the retailer and jobber are mutual, because small dealers cannot always buy of manufacturers, and even the largest dealers find the jobbers' stocks a convenience. Even though the jobber sometimes sells to the consumer and the retailer sometimes buys of the manufacturer, it is necessary to the welfare of both retailer and jobber that the relations existing between them be confidential and cordial, because too many manufacturers are disposed to jump over the heads of both jobbers and retailers and sell to the catalogue houses and department stores. The jobber has influence with the manufacturer, and this influence the jobber necessarily exercises in favor of the retailer, because it is the retailer to whom the jobber looks for his trade. In conclusion Mr. Ireland stated that a high standard of business methods on the part of both retailer and jobber would cover the entire ground and details would take care of themselves.

The association adjourned to meet at 7 p.m. at the Columbia Club, where they were tendered a banquet by local jobbers and manufacturers.

Banquet.

The banquet Tuesday evening at the Columbia Club was a brilliant affair, both in point of the elaborateness of the *menu* and the unusual excellence of the speeches which followed. John B. Cockrum, general counsel of the Lake Erie & Western Road, was the toastmaster, and his introductions were happy as they were brief.

Address of Welcome.

E. M. Bush, president of the Indiana State Association, the first speaker, welcomed the delegates on behalf of the State and city, and spoke of the work accomplished by the National Association in the four years of its existence. To the retail Hardware dealers of the United States he gave the credit of being the first and still the only organization of retailers who organized to give battle to the catalogue house evil and the menacing parcels post legislation. The catalogue house encroachments he considered the greatest immediate menace to the trade, and spoke of the injustice of manufacturers selling at lower prices to such houses than they do to the retail dealer, whose work had created the demand which permitted the sale of the very articles they thus sold. In this connection he gave praise to the jobbers of the State and country for taking a hand in the fight on the side of the retailer.

W. P. Lewis' Address.

W. P. Lewis, ex-president of the State Association, the next speaker, gave to the National Association the credit for the recent recognition of the retailer by the manufacturers and jobbers of the country. He spoke eloquently of the Government and the Constitution, which vouchsafed to the American citizen the right of life, liberty and the untrammelled pursuit of his chosen vocation, but called attention to the influences which were at work to curtail or abrogate these rights. That these influences had assumed formidable proportions was proved by the fact that a judicial committee at Washington was actually considering the proposition to deprive the courts of the land of the power of injunction, which was paramount to the destruction of the power of law itself, and its subservience to the votes of anarchistic labor leaders.

Another menace emanating from the same source was the proposed law that said to a laborer that he might work only eight hours, a proposition which was contrary to the commercial progress of the country and the individual advancement of its citizens. He paid a tribute to President Roosevelt for putting the laws of the nation above the rules of a labor union, and for having the courage to risk the loss of 1,000,000 votes in upholding a principle when he refused to discharge a foreman who had suggested a means for doing more work with less men than had been done. This sentiment was roundly cheered, and the health of the President of the United States was drunk at the suggestion of the toastmaster.

Indiana Pride.

John L. Griffiths, a prominent Indianapolis attorney and politician, delivered the most finished address of the evening, on the subject of State pride. His oration exalted Lew Wallace, James Whitcomb Riley, Booth Tarkington Mrs. Catherwood, and other Indiana authors, as making the great West and not New England the center of the nation's literary life; but placed higher than mere individual accomplishment in art, letters, manufacturers or commerce the patriotism and individual character which was broad enough to set public welfare above private gains.

Other Addresses.

F. C. Moys of Boulder, Col., spoke of the development of the great West, and praised the Governor of Colorado for his courage in enforcing law in the face of the anarchy and violence of organized labor.

W. H. Bogardus, the national president, told a string of witty stories to illustrate the difference in point of view, and spoke of the importance of building up a character which would permit the Hardwareman to exert his efforts along lines that not only benefited himself

personally but that would be of lasting benefit to his communities, the State and nation.

A. T. Stebbins of Rochester, Minn., treasurer of the National Association, said that notwithstanding the protests that Hardware dealers felt it necessary to file against evident evils, they were optimists at heart, and believed the world was growing better every day, and that they were organized to do all in their power to benefit humanity while they were fighting battles in which victory meant more than selfish gains. He spoke of the rivalry which existed last year between Indianapolis and Minneapolis as to which city should have the present convention, and predicted a victory for the Minnesota City for the next convention.

AUSTRALIAN NOTES

FROM A SPECIAL CORRESPONDENT.

MELBOURNE, February 10, 1904.

THE month of January and the early part of February have established a record in the way of rainfall in Victoria. The effect has been very pronounced. The harvest is with us, but its value is slightly depreciated—in parts, severely so. The strong winds and rain, so unusual at this season of the year, have had the effect of shedding and overripening the crops. Some growers reckon to have lost from 2 to 4 bushels an acre through shedding. Harvesting work, which ordinarily would take a fortnight, has been prolonged over a couple of months in many instances. Bright weather is indispensable for stripping, as in damp weather the heads, being tough, will not thrash out by the operation of the stripper. Here the combined Harvester comes in, as, in addition to stripper comb and beaters, it has a peg drum for thrashing the heads which the beaters miss. But the combined Harvester won't work in wet weather, and many farmers have fallen back on the binder, a more costly process with crops beaten down by rain. Plowing time is almost round again for the next crop, and the first one not in yet. Still, despite these drawbacks, the harvest will still stand as a record one.

Value of Wheat Shipments.

Our wheat shipments have been very heavy, and at date the three wheat States have exported nearly 7,000,000 bushels, as follows: Victoria, 3,050,000; South Australia, 1,944,000; New South Wales, 1,830,000.

The c.i.f. value of the above is about £1,250,000, and the "drawing" value, allowing for ocean freights, about £1,050,000. Exports promise to extend over the whole year.

The Hardware Trade

has naturally been affected by the weather, although there seems little doubt that the farmers will very speedily show more buying activity. Needless to say, harvesting machinery people and implement makers have had and are still having busy times. The mining machinery and foundry trades have not yet shown signs of really marked improvement, although the tendency is decidedly for the better. Indeed, the outlook generally is a hopeful one.

American Machinery Representatives.

H. P. Gregory & Co., well known in Australia for many years as representatives of various American machinery houses, have dissolved partnership as regards the Melbourne and Sydney business. The firm will continue to trade under the old name at 74 Clarence street, Sydney, the partners being R. W. Finlayson and H. S. Smith. The Melbourne house will trade as Smith & Cooke (J. O. Smith and A. L. Cooke), and will continue to handle the same lines at 435 Bourke street.

New Zealand Customs Decisions.

New Zealand gazetted customs decisions include the following: Leather Belting, accompanying machinery when imported, 4 pence per pound; Cycle Brazier and Forges, free; Gas Braziers, free; Exhauster for planing mill, free; Turbines for flax milling machinery, 20 per cent.

NORTH & JUDD MFG. COMPANY.

THE NORTH & JUDD MFG. COMPANY of New Britain, Conn., are operating their new annealing house, which gives them greatly increased facilities in this process of manufacture. The new building is 70 x 163 feet, with high monitor roof, and is exceptionally well lighted and ventilated. On one side of the building are 14 steel curtained doors, 8 feet wide and 12 feet high. On the opposite side are 14 large windows, set well above the floor, to provide the maximum of light and also of ventilation for the rising heated air and the gases from the furnaces. These windows are arranged for simultaneous opening at top and bottom by means of a simple arrangement of chain and pulleys. There are three sashes, that in the center being fixed. Each of the others has a groove of its own to slide in, one groove inside and the other outside of the line of the fixed sash. At either side of the windows, at the top, is an ordinary wheel pulley, over which runs a chain, its ends fastened to the two sliding sashes and its length being just sufficient to permit one sash to be way up while the other rests upon the window sill. Each sash acts as a counterweight for the other, so that when one is pulled or pushed the other acts with it, which greatly expedites the opening or closing of the windows.

The two annealing furnaces are equipped to burn both coal and oil. Each has interior dimensions of 15 x 27 feet, with a capacity of 100 pots, or 40,000 pounds of light work.

BANQUET TO JOHN H. SHAW.

AS an indication of satisfaction at the safe return of their superintendent, John H. Shaw, from a pleasure trip through the South and Mexico with a party of eight, including Mrs. Shaw, when 9000 miles were traveled in nine weeks, the department heads of Sargent & Co., New Haven, Conn., gave a banquet in his honor Saturday night, March 19, at the Tontine Hotel. Fifty covers were laid and every chair was occupied. The decorations, music and menu were in keeping with the occasion, the latter being designed for the affair. On the cover was a likeness of the guest of honor, surrounded by a wreath consisting of Hardware articles made by the company. The wreath encircling the picture was designed by a member of the committee, John B. Freysinger, to whom much credit is due for the success of the enterprise. W. H. Wright, acting as chairman, introduced Robert MacArthur as toastmaster. The first speaker was the guest of the evening. At the guest table were J. B. Sargent, Charles C. Adams, George L. Sargent, Henry Sargent, Lewis Sargent, J. F. Sargent, Edward Sargent, John Sargent and Ziegler Sargent.

A TRIP TO CUBA.

H. C. NOBLE, treasurer of the North & Judd Mfg. Company, who visits Cuba annually, has just returned from the tenth trip to that country. Mr. Noble expresses surprise at the marvelous results accomplished in the last five or six years, and the quick return to prosperity of the Cuban people. Havana is about to begin a system of street improvements, sewer system, &c., made possible by the Government loan of \$35,000,000, just placed, all of which was taken by Speyer Bros., New York, at 90½ cents on the dollar. The mail service has been improved, three mails a week now crossing the channel between Florida and Cuba. Transportation facilities have changed greatly for the better in the later years. Foreign made goods still predominate there, and the bulk of imports and exports are carried in foreign bottoms, a condition that will doubtless require time, enterprise and persistency to overcome in favor of the United States, from where the bulk of their merchandise should come.

THE W. W. DICKINSON HARDWARE COMPANY, Little Rock, Ark., have had plans drawn for a new warehouse. The building will be of brick construction, five stories in height, 90 x 140 feet, and will cost about \$60,000. The plans are now in the hands of contractors.

FACTORY COST AND BUSINESS METHODS.

COST FINDING FROM A MANUFACTURER'S VIEWPOINT.

BY CHAS. A. GEIGER.

An interesting paper read before the National Association of Wagon Manufacturers by Chas. A. Geiger, manager of the Troy Wagon Works Company, Troy, Ohio.

PART I.

Quite a percentage of manufacturers rely upon the demand for seasonable goods. The crops and the weather are large factors in governing both the demand for them and their expense of manufacture, and no cost finding system is safe which does not comprehend these contingent conditions extending over a period of years. Plant, material and labor accounts are in a sense controllable. Co-expense covers the contingencies, and the total of these accounts taken from the sales account leaves the net profit, and to be sure that each item of the sales account carries with it its proper proportion of these expense accounts is the purpose of cost finding.

The cost of an individual article of manufacture is then the sum total of the proper proportion of each expenditure of the business, which, taken with all other costs of individual items, equals the total of all expenditures of whatsoever nature.

PROFITS ARE BEING CURTAILED.

Present day manufacturers accept as true that profits are being curtailed in many directions, by high and unstable materials, uneasy and arbitrary labor, decreased competition on the purchasing department, and increased expense in the selling market, and that under the old system it is impossible to keep pace with the changes, and only the closest attention to detail will enable them to detect the line between profit and loss. Weak places must be strengthened quickly. Guessing at a proper and profitable selling price, or allowing the traveler or competitor to name it, is no longer safe. Easing the mind by increased inventory price of materials on hand only puts off the fatal day, and leads to increase of capital stock and further self-deception.

MANUFACTURING MUST BE PROFIT SUSTAINING.

To be permanent the business of manufacturing must be profit sustaining within itself. Apparent profits by reason of increased market price of materials on hand are not manufacturing profits. Actual manufacturing losses are frequently covered up by prospective profits, apparent only through force of outside circumstances. The correct measure of a manufacturer's profits is the amount by which he increases his holdings, by his self-controlled efforts, and no other measure is real or safe. Each unit of the output must bear its proportion of all expenses, and to correctly apply the measure the departmental division and individual responsibility are primary requisites. Individual cost finding necessitates continuous cost finding and proper assembly.

MANUFACTURER MUST MAKE OUT HIS OWN SYSTEM.

Expert accountants have in many cases failed to accomplish accurate results, through lack of knowledge in the particular business undertaken, but the fee paid them, however, has not been lost, because the manufacturer has been impressed with the necessity of results, and has subsequently wrought out his own salvation. Each manufacturer must apply the general idea of his own case. Continuous cost finding locates the leaky and weak places, establishes a reason for variation in output, increases the output of the individual and consequently that of the plant, assists stock tracing and stock keeping, locates the necessity of and establishes the advisability of new machinery and improvements, stops delays in special work, and impresses the management with the great extra cost of special jobs and what it costs to ac-

commodate the factory to the special whims of a customer, enables quick and proper adjustment of fire losses, keeps a continuous inventory, and allows correct daily, weekly or monthly statements of profits, assures the management of complete control, and requires no traveler or competitor to name the price of the product.

CO-EXPENSES.

The expenses other than labor and materials—viz., co-expenses—must be applied to the product in proper proportion, and a safe rule covering all contingencies is sought. The co-expenses are as follows: Repairs under warranty, freights, drayage and teaming, interest, cash discounts allowed, insurance, taxes, traveling salesmen and commissions, printing and postage, advertising, fuel and light, shop supplies, maintenance of buildings and tools, depreciation, general expense accounts and bills to loss and gain, salaries of office, &c., including superintendents, foremen, engineers, watchmen, &c., if kept separate from shop payroll, and all based upon an equitable time average. The items coming under this head require a vast amount of attention, and are of even more importance than the payroll, and, as a rule, are larger in the aggregate than the labor account, and more difficult to control. Many of them are fixed charges, which increase when business is poor, and all of them must be provided against long in advance of their coming. Not a single one of them but must be paid for out of the product of the plant, as they are just as much a part of the cost as is labor.

CO-EXPENSE ADDED IN PROPORTION TO LABOR.

The length of time which is required to complete a given amount of material is the measure of the co-expense it should bear. The amount of labor spent on a given amount of material is the surest measure of the time required, and, therefore, the correct basis upon which to calculate the proportion of co-expense; and, that the relation of these expenses to one another may always be known, their percentages should always be taken on the same basis. Labor being the best measure, all co-expense should be added by percentage of the labor expended. In order, therefore, to fix the amount to add for co-expense, the percentage of total co-expenses to the total labor is ascertained on the basis of several years' experience. When, then, the labor is known on a given article, the co-expense percentage is added, and the total, together with the cost of materials, constitutes the cost of such article, and it is known that the article bears its proportion of all the expenses of the business.

PRODUCTIVE AND NONPRODUCTIVE LABOR.

Accuracy in all the items, then, depends upon the accuracy of the labor accounting. Part of the labor account is readily chargeable to a given product, because easily reckoned, and is, therefore, called productive labor, and described as being the piece worker or mechanic whose labor applies to any one particular article, and the cost of whose product can be readily reckoned by weight or count. A very considerable proportion of the labor account cannot be specifically located as chargeable to any one article, and is, therefore, called nonproductive labor. The productive labor is specific, and the difference between it and the total labor is the nonproductive, which, when reduced to a percentage of the productive, is readily added to the cost of the given article on which the productive labor is known.

In labor cost finding, then, the effort should obviously be to get just as much as possible into productive labor account without complication. Superintendents, foremen, night watchmen, teamsters, engineers, firemen, oilers, shippers, &c., and such a part of the office force and management as have to do with the factory, are nonproductive and should be so accounted, instead of under co-expense.

FACTORY ORDERS SHOULD ORIGINATE FROM SALES BOOK.

As a means necessary to secure not only accurate labor costs, but complete material costs, it is imperative that complete itemized and detailed lists of all materials required to complete a given unit be had. These specifications should be priced at the flat first cost to the factory, as all the labor and other expenses incurred are to be added in order to obtain the total net cost of the finished

product, including cost of selling as well as securing pay for same. No work of any kind should be done in the factory on the product unless upon order from the office, which includes complete specifications, and these factory orders should all originate from the sales book, because the record of sales is the primary source from which all work in the factory emanates. There are sales for immediate and future shipment, and a prospective trade not specifically mentioned from regular customers whose business averages about the same each season, frequently several kinds and sizes for the same customer.

It is impossible to build all units from the start after the order is received. Past experience tells in what proportion various sizes will be needed and when shipment will be required. In advance these proportions should be agreed upon, and stock should then be made up, a safe number of each size, forming an ideal stock on hand based upon the experience of the sales book. All the detail parts necessary to finish these units should be complete, but it is not necessary to assemble them until shipment is required, though they may include a given complete stock on hand in warehouse.

As the sales book fills up the ideal stock should be consulted and orders made on the factory to replenish it, but always for so many complete units, for neither more nor less parts than are actually required. The factory is then producing only merchantable stock and not over-producing one size are part and under-producing another; and when shipments are due they can be made without annoyance to the factory or shipping departments. Orders for replenishment of the ideal stock should be placed in all departments at the same time, so that each foreman knows what is coming and what is expected of him, and the superintendent can readily balance the labor in each department, and if any department is falling behind can give it proper attention.

(The conclusion of this paper will discuss the charging of labor, division of co-expense, charges to cover depreciation, making inventory, &c.)

THE QUEEN VEGETABLE AND KRAUT CUTTER.

IN the reference in *The Iron Age* March 10 to the manufacture of the Atkins Queen Vegetable and Kraut Cutter now made by the Tucker & Dorsey Mfg. Company, Indianapolis, Ind., the statement was inadvertently made that the above concern had taken over the manufacture of that device. The facts are that E. C. Atkins & Co., also of Indianapolis, have a contract with the patentee of this article for the sole right to manufacture and sell the Queen Vegetable and Kraut Cutter. They having for years made the Knives for the various Tucker & Dorsey Slaw and Kraut Cutters, the latter arranged to manufacture the wood parts of the Atkins Queen Cutter, at the same time E. C. Atkins & Co. licensing Tucker & Dorsey to sell the Queen Vegetable and Kraut Cutter in connection with goods of this character made exclusively by Tucker & Dorsey. Both concerns are thus mutually interested in its sale.

STANLEY WORKS.

THERE was a slight fire in the rolling mill connected with the plant of the Stanley Works at New Britain, Conn. The damage fortunately was comparatively small and confined to an unimportant section of the building. No machinery of any kind was injured, and the fire has caused no interruption in the running of the plant or the execution of orders.

CLIPPER SHEAR COMPANY, Clyde, Ohio, have recently incorporated with an authorized capital stock of \$25,000, F. W. Jackson being president, C. P. Alexander, vice-president, and A. C. Bliss, secretary and treasurer. They purpose manufacturing a full line of Hand Forged Steel, Oil Tempered Pruning Shears and Cutlery and Hand Forged Knives of every description.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE, 1 NORFOLK ST., LONDON, W. C., March 12, 1904.

The Week's Hardware Trade.

THERE is nothing fresh to report this week as to the state of the market, which still continues unsatisfactory. Money is exceedingly tight, and there is a marked indisposition to buy except for immediate necessary purposes. For the month of February there was a decrease of £36,683 in the imports of Cutlery, Hardware, Implements and Instruments, the figures being £299,972, as compared with £336,655 in February of last year. This decrease is most marked in imported Hardware, which reached £102,548, as compared with £115,640 in February, 1903. Of this total no less than £44,450 was Enameled Hollow Ware, Hollow Ware not enameled being valued at only £1740, other Hardware reaching £56,358. Cutlery considerably advanced, from £2179 in February, 1903, to £3811 last month. From what I have seen in various warehouses, both in London and the Midlands, I am satisfied that a considerable quantity of this increase is from America.

On the export side there was an increase in the sales of Cutlery, Hardware, Implements and Instruments of £30,093, the amount being £352,425. The countries with which we are doing an increased trade in Hardware are Russia, Sweden, Holland, France, Spain, Italy, Brazil, Argentina, India, Australia, New Zealand. I draw special attention to the figures for South America as bearing out numerous comments I have recently made about increased trade in that quarter of the globe. Our trade with Brazil has nearly doubled, and our exports to Argentina have considerably more than doubled, not merely for February, but also for the last two months.

It may seem curious to report increased foreign exports and yet constantly to be describing the market as stagnant. As a matter of fact, the one event explains the other. The fact that there is a decrease in imported Hardware indicates a slackening in our purchasing capacity for domestic goods of one sort and another, which points to a lower level of wage earning. The fact that our exports increase is to me evidence that merchants, failing to place the old proportion of their products on the home market, are now pushing them in other markets. Export prices have fallen, and although the export business shows an increase in volume and value, yet it is not so remunerative as it was last year, when smaller quantities were exported.

Electrical Apparatus in Egypt.

The British Chamber of Commerce of Egypt, in its report for December, expresses the opinion that among the various fields of enterprise in that country that offer opportunities in the present and are susceptible of indefinite extension in the future the trade in electrical appliances occupies a prominent position. Egypt is not and never will be—at all events in the immediate future—a manufacturing country, and the lack of natural water power has hitherto stood in the way of the use of electricity, even for such industrial purposes as cotton ginning, pressing, seed crushing, &c. But for traction, lighting and telegraphic and telephonic communication there is a constant and ever increasing demand for electrical machinery, apparatus, instruments, tools and fittings. Cairo and Alexandria have long been served by electric tramways, and the latter city is now extending its electric system over the railroad line connecting it with the suburb of Ramleh. The use of electric light as an illuminant is daily becoming more general in palaces, public buildings, private houses, works, &c., not only in chief cities, but in many towns of the interior, such as Mansurah, Tantah, Zifta, &c. Several of these towns light their streets by electricity, though the Cairo and Alexandria thoroughfares are still supplied by gas. Assiout, Fayoum and Zagazig are instances of places which are about to establish an electric light system of their own. Electric power will be employed more and more in drainage and irrigation works. The demand for telegraphic and telephonic material is constantly increasing; trunk telephonic lines now connect Cairo and

Alexandria, and similar lines are being laid down for interurban communication in the interior.

In wiring for all purposes Great Britain is not in the market; plain copper wire is imported almost entirely from France and Belgium and covered wire from Italy, English products being at least 20 per cent. dearer. With regard to telephone apparatus, after referring to the premier position held by the Ericsson wall instrument, the report says:

A table apparatus of similar excellence has not, however, yet been put on the market, and we recommend inventors and manufacturers to devote their energies to the production of this much needed article. For petty fittings such as insulators, bells, lamps, &c., British manufactures, though recognized as the best, are ruled out of the Egyptian market, which always prefers a cheap article when it can get it. British firms frequently execute orders for low priced fittings by supplying foreign made goods. They still carry on a good trade in brackets, electroliners, &c., made of brass and other metals, but there seems opportunity for development generally, not only in the direction of the production of cheaper goods but in that of the advertisement, the representation by agents and travelers, and the demonstration of the superiority of British manufactures.

Swiss firms are the best known in Egypt for the production of dynamos, though those of English manufacture are extensively in use; there appears room for more active competition in this department, such as has already been forthcoming from German firms.

Goods Wanted in Western Australia.

D. H. Ross, the Canadian commercial agent for Western Australia, in a report to hand says that there is undoubtedly a market in that State for Buggies and light Wagons suitable for farmers' use. The local production is, at its best, a heavy and rather clumsy article, while the prices obtained seem much higher than in the Eastern States. Owing to the extreme heat in the summer season, especially in the gold fields districts, it is absolutely necessary that any vehicles sent should be made of well seasoned timber. In the mining districts there is in much favor a locally made "two wheeled Knock-about." With the vehicles Harness will also be required.

Machinery, Electrical Appliances, &c.—The class of goods required by the mining districts is of a very comprehensive nature, comprising machinery, electrical appliances, &c., of almost "one thousand and one" kinds. At Kalgoorlie there are a number of large importing firms, besides which some of the mining companies import the bulk of their requirements. Successfully to push the sale of any special article requires, in most instances, the services of a local representative.

Inquiries were received for the following goods which may interest manufacturers: Asbestos Air Cell Pipe up to 10 inch; Asbestos Boiler Covering, Rubber Belting and Packing, Belt Stretchers and Fasteners, Filter Cloth, Fuse, Antifriction and Axle Grease, Oils, Oil Filters, Lubricators, Plummer Blocks, Rawhide Gears, Safety Valves, Shoes and Dies, Steel Rails, Truck Wheels, Woven Wire, Battery Screening, Cyanide, &c.

Water Meters.—Catalogues and prices of Water Meters have been asked for by several firms in Perth, Western Australia. The Meters are examined by the Government and must stand the necessary test for accuracy.

Refrigerators or Ice Chests.—There is a big demand for Refrigerators or Ice Chests, and it will increase as the cost of ice becomes less. There is certainly room for enterprise in making an effort to secure orders.

AMERICAN BOXES FOR FOREIGN IMPORTS.

ROBERT C. LOWRY & CO., 17 State street, New York, are wholesale exporters of Box Shooks and Cloth Boards in carload lots only. This business, established in 1871, has one important helpful element in the fact that foreign goods imported into the United States are subject to no duty on the value of the boxes when packed in boxes originating in America, provided the component parts cut to size are not made over, recut or otherwise changed in dimensions after leaving the United States. On the contrary, foreign made boxes bear the same duty on value of box as the foreign goods which they contain. The method of carrying on this business is to cut and dress the lumber to the proper dimensions and send over to be assembled and made into

box form on the other side. The business thus far has been largely with Great Britain and Ireland, box makers there in various centers from London to Glasgow and Belfast importing the material and making it up as the manufacturers want it. The Shooks are furnished in $\frac{5}{8}$, $\frac{3}{4}$, $\frac{1}{2}$ and 1 inch sides and ends to measure inside from 10 inches long to 50 or 60 inches and proportional widths, from spruce and fir timber, to meet the competition of Norway, Sweden and Baltic territory. An English box of foreign material costing 10 shillings sterling often carries a duty of 35 to 65 per cent., a duty of 50 per cent. making the package duty \$2.20, against nothing for the American boxes, the prices of which, we understand, delivered on the other side, do not vary much from those of the English boxes.

JOHN S. LENG'S SON & CO.

JOHN S. LENG'S SON & CO., 93 Reade street, New York, with storage warehouse still at 4 Fletcher street, where they have been located for 43 years, have taken over the Bicycle stocks and business of a number of well-known houses in the past few months, consolidating everything in this line at their new quarters at Reade and Church streets, in the heart of the downtown Bicycle and Automobile district. The concerns disposing of this one branch of their business, however, still continue their other lines as heretofore. Among the departments thus absorbed are those of Schovelling, Daly & Gales, 302-304 Broadway; C. B. Barker & Co., 93 Reade street; Robert H. Ingersoll & Bro., 67 Cortlandt street; C. Murray Rice, 26 West Broadway; Industrial Cycle Company, and Logan, Gregg & Co., Pittsburgh, Pa. The advantage of this movement to Bicycle dealers, repair men and riders is the ease with which not only new and modern materials in wide assortments can be obtained, but the facility afforded for getting needed parts for wheels long in use from a single source. A number of important features have also been introduced as the result of their long experience and familiarity with the business which simplify and reduce the cost of principal necessary parts when repairing out of date wheels. For instance, they keep in stock, of weldless cold drawn steel, Repair Forks in a variety of styles of crowns to match patterns not now made, with extra long threaded stems, in plain, enameled and nickel plate finishes. In front and rear Axles they are prepared to furnish out of stock the Axle with Cones and Nuts complete for universal repair work at nominal cost.

FINE POCKET CUTLERY.

GRAEF & SCHMIDT, 107 Chambers street, New York, sole agents in the United States and Canada for J. A. Henckels, Solingen, Germany, have now in stock here some beautiful examples of fine pocket Knives, some of which are specially made with reference to the St. Louis World's Fair, at which J. A. Henckels will make a grand exhibit, their architect from Germany, with the necessary assistants, being now in St. Louis superintending the work of installation. One of the Knives is $2\frac{3}{4}$ inches long, closed, with steel scales or handle, etched in silver against a gold ground, showing a reproduction of the Louisiana Purchase Monument erected permanently in the grounds to commemorate the event. There are two blades, one pair of Scissors and a Nail File at the back. On the reverse side, handsomely etched and inlaid with colored enamels, are the words "The World's Fair at St. Louis, 1904," with an American flag in *fac-simile*, with ornamentation in leaves, &c. Another superb example of Knife Cutlery is a Champagne Knife, 3 inches long, closed, with steel scales, oval in shape, $\frac{3}{4}$ inch wide at center, tapering to rounded ends of about $\frac{1}{8}$ inch, containing two strong blades, a champagne hook and corkscrew.

WHILE the ownership of the Superior Chain Company, Marysville, Pa., has changed hands, the plant will not be moved, but operations will continue as heretofore under the management of Leiby & Beers as lessees.

LANDERS, FRARY & CLARK'S CATALOGUE OF PLUMBERS' BRASS GOODS AND HARDWARE.

LANDERS, FRARY & CLARK, New Britain, Conn., and 82 Chambers street, New York, have issued their Plumbers' catalogue, which shows the present list of Brass Cocks adopted by all the manufacturers of these goods. It includes many goods which are of interest to the Hardware trade, the list prices of which have been recently revised. Other changes made some time ago in the list prices of Compression Bibbs, Stop and Waste Cocks and other goods are covered by this catalogue, which is thus brought up to date on the entire list of goods. Irregularities in the old lists are thus corrected and revised lists given on the following goods:

Racking Cocks.	Lager Beer and Ale Cocks.
Liquor Cocks.	Beer Vents.
Globe Cocks.	Refrigerator Cocks.
Kerosene Oil Cocks.	Water Cooler Cocks.
Compression Lock Cocks.	Compression Oil Can Cocks.
Andrews' Faucets.	Petroleum Faucets.
Safety Faucets.	Basin Cocks.
Whiskey Cocks.	Bath Cocks.
Boiler Cocks.	Simplex Stop and Waste Cocks.
Bottling Cocks.	Hydrant Cocks.
Plain Bibbs.	

REFERRED TO HARDWARE MERCHANTS.

THE following inquiry from a well-known house on the Pacific Slope is referred to our readers. We shall be pleased to receive advices and suggestions in reply:

What is the most approved style of showcase, and best method of display for retail line of Pocket Knives of about 300 patterns?

TRADE ITEMS.

THE DAVENPORT WASHING MACHINE COMPANY, Davenport, Iowa, have been incorporated with a capital stock of \$10,000, to manufacture Washing Machines. Quarters have already been secured for the business. The officers are: President, Julius Krabbenhoft; vice-president, Henry E. Carstens; secretary and treasurer, Gustav Krabbenhoft.

SENATOR WM. W. ARMSTRONG of the Forty-fourth Senatorial district, New York, is the author of two acts now pending in the Legislature to amend sections 409-410 of the Penal Code of this State, relative to the sale of dangerous weapons to boys under 16 years of age, without the written consent of a police magistrate. The sections as they now exist in the statutes apply to persons variously of 12, 16 and 18 years of age, according to the weapons described, the pending amendments, which have passed the third reading, seeking to make a uniform age of 16 years and throwing certain restrictions around the use of such weapons within the limits referred to.

The Messinger Hardware Company, composed of Charles Messinger, Jno. C. Tracy and George E. Tracy, have purchased the Hardware business, including stock and good will, of the Haney-White Company, located at 2730 North Broad street, Philadelphia. Articles of incorporation have been applied for by the new proprietors, and the business will be transferred to the corner of Broad and Huntingdon streets, where a full line of Builders' Hardware and Contractors' Supplies will be carried. Mr. Messinger was formerly manager of the Hardware department of the Haney-White Company.

RED JACKET MFG. COMPANY, Davenport, Iowa, issue catalogue and price-list No. 36, 127 pages, relating to Red Jacket "So Easy to Fix" Hand and Power Pumps, Pump Cylinders and Supplies, Artesian Well Cylinders, Drive Well Cylinders, Valves, &c. The company will be pleased to furnish jobbers as many of these catalogues as they can use to advantage, the name of the house being printed at the bottom of the front cover, where space has been provided. The manufacturers report trade on their Red Jacket goods as steadily growing.

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REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses:

FROM W. B. MINNIS & Co., New Market, Tenn., who are soon to open a Hardware store at Jefferson City, Tenn.

FROM J. J. BUCHANAN, Burnett's Creek, Ind., who has bought the Hardware, Stove, Implement and Harness business formerly conducted by Hiram Beshoar.

FROM LEONHARD, BREFELD & SAUTER HARDWARE COMPANY, Trenton, Ill., who have organized, with a capital of \$10,000, to carry on the retail Hardware, Stove, Implement, Paint, Roofing and Furnace business.

FROM B. L. BURRUS, Detroit, Tex., who has succeeded Burrus Bros. & Martin in the Hardware, Stove and Furniture business.

FROM SCHAAAL & DONOHUE, who have lately commenced the Hardware, Stove and Mill Supply business at Erie, Pa.

FROM ROWLAND HARDWARE COMPANY, Rowland, N. C., who have been incorporated with a capital stock of \$4000 to conduct the Hardware, Stove, Farming Implement, Paint and Sporting Goods business.

FROM FULLER & FILER, Addison, N. Y., who have succeeded J. H. Roberts in the general Hardware business.

FROM VROOMAN HARDWARE COMPANY, Plainview, Neb., who have recently succeeded Baldwin Bros.

FROM MAYWOOD SUPPLY COMPANY, INCORPORATED, Maywood, Neb., who have bought out A. M. Freeland, and will continue the wholesale and retail business in general Hardware, Paints and Oils, Implements, &c.

FROM HODGES & EWING, Nelson, Neb., who have succeeded Horner-Johnston Hardware Company.

FROM ELLANDSON & HAMMER, who have bought out the Hardware and Stove business of Gullikson Bros., Iola, Wis.

FROM GUILLET & STOUT, Tina, Mo., who have succeeded Edmonds & Co. in the Hardware, Stove, Paint and Implement business.

FROM J. J. ROBINSON, Marshall, Ill., who is successor to the Hardware, Stove, Paint and Sporting Goods business formerly conducted by Robert Mitchell & Co.

FROM BROWNE-WESTBROOK HARDWARE COMPANY, Dillon, S. C., who have been incorporated, with a capital stock of \$5000, to carry on the wholesale and retail business.

FROM KRINGS & ATKIN, Atchison, Kan., who have bought the General Hardware stock formerly owned by J. H. Nass.

FROM WITT-RICHARDSON HARDWARE & IMPLEMENT COMPANY, Clarendon, Texas, who are continuing the business formerly conducted by G. C. Hartman.

FROM FEILER & GABRIEL, Eudora, Kan., who are successors to Carl Durr in the Hardware and Agricultural Implement business.

FROM WM. J. WILEY, West Somerville, Mass., who has bought the Hardware, Stove and Agricultural Implement business of A. Vanderhoof.

FROM ELYSIAN HARDWARE COMPANY, Elysian, Minn., who have been incorporated, with a capital stock of \$10,000. The incorporators are H. L. Chaffee of Minneapolis and Jos. A. Geissler, Sr., and Jos. A. Geissler, Jr., of Elysian.

FROM A. MCKENZIE & SON, Lenox, Iowa, who have succeeded Martin & McKenzie in Hardware, Stoves, Farming Implements, Paints, &c.

FROM FOLLETT & PEDDIE, Shelburn, Minn., who have bought the Geo. Kell general Hardware stock.

FROM ARTHUR J. BAXTER, Neosho Falls, Kan., who has succeeded W. W. Satin in Shelf and Heavy Hardware, Stoves, Implements, Paints, &c.

FROM ITALY HARDWARE COMPANY, Italy, Tex., who are successors to Bracken & Hilderbrand.

FROM J. SEAMAN HARDWARE COMPANY, Greenville, Ill., who have incorporated with a capital of \$25,000 and will continue the business formerly conducted by J. Seaman.

FROM A. S. BLOEDEL & Co., who have succeeded Orr & Co., Tabor, Iowa, in the Hardware and furniture business.

FROM MORTON HARDWARE COMPANY, Bessemer, Ala., who have recently increased their capital stock from \$5000 to \$10,000.

FROM FREEMAN & GREEN, Lebanon, Tenn., who have succeeded H. M. Freeman, Shelf and Heavy Hardware, Stoves, Implements, &c. The firm have recently moved into a new building.

FROM MCGHEE BROS., Miami, I. T., who have bought out the general stock of Jasper Stewart. McGhee Bros., are also proprietors of a store at Dawes.

FROM THE LOEW HARDWARE COMPANY, 299 Prospect street, Cleveland, Ohio, who have been incorporated with a capital stock of \$10,000.

FROM SCHLEUSENER HARDWARE COMPANY, Sauk Center, Minn., who have succeeded Schleusener-Ingram Hardware Company.

FROM JOS. H. GOLDCAMP & Co., Lancaster, Ohio, successors to J. H. Goldcamp, wholesale and retail Hardware, Implements, Sporting Goods, Harness and Vehicles. The firm have lately taken possession of a new three-story and basement brick building.

FROM C. N. DACK & Co., Oskaloosa, Iowa, dealers in Shelf and Heavy Hardware, Stoves, Sporting Goods, &c.

FROM RICE & KITTERMAN, Bellaire, Kan., who have bought out Samuel Null, in the Shelf and Heavy Hardware and Vehicle business.

FROM PATERSON HARDWARE COMPANY, Albert Lea, Minn., who have been organized with a capital of \$25,000 to conduct the wholesale and retail business in Hardware, Implements, Buggies, &c.

FROM J. E. BRODMARKLE, Lebanon, Kan., who has bought out the Hardware, Stove, Paint and Sporting Goods business of Barnes & Godden. Mr. Brodmarkle traveled for A. J. Harwi Hardware Company, of Atchison, from 1887 to 1890, and for the past five years for the Simmons Hardware Company, of St. Louis.

FROM FRED S. PLAISTED, Penn Yan, N. Y., who has succeeded Charles C. Hicks in the general Hardware and Agricultural Implement business.

FROM NICHOLS & RANKIN COMPANY, Burlington, Iowa, who have been organized with a capital stock of \$25,000 to carry on the Shelf Hardware, Stove and Sporting Goods business.

FROM NEWTON WETZEL, who has bought the general Hardware business of J. F. Rowe, Hill City, Kan.

FROM RUSSELL & BAILEY, Ord, Neb., who are continuing the Hardware and Implement business formerly conducted by Mr. Russell under his own name.

FROM F. M. THOMPSON, who has lately purchased the Hardware, Stove and Implement business of Ong & Edgar, Edgar, Neb.

FROM BRITTON, MYERS & Co., Decatur, Ind., who have succeeded Britton Bros. in Hardware, Stoves, Implements, Paints, &c.

FROM T. O. ANDERSON, Coin, Iowa, who succeeds Ed. Mitchell in Hardware, Harness, &c.

FROM CUPPY & MOSS, Kemp, Ill., successors to J. Andrews & Son, general Hardware, Implements, Wagons, Buggies, Stoves, &c.

FROM E. O. LOVE, Tyrone, O. T., who has recently opened up in the retail business, handling Shelf and Heavy Hardware, Stoves and Farming Implements.

FROM BOYLE & DAGUE, Holton, Kan., who have succeeded Woods & Boyle, Hardware, Stoves, Implements, Paints, Sporting Goods, &c.

FROM THE QUINTON HARDWARE COMPANY, Quinton, I. T., who have succeeded R. L. Quigg Hardware Company. The stock is being largely increased.

FROM BALTZELL-DONALDSON COMPANY, LIMITED, Hammond, La., who have succeeded T. S. Baltzell, wholesale and retail Shelf and Heavy Hardware, Stoves, Agricultural Implements, Paints, Sporting Goods and Harness.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers issuing new catalogues or price-lists are requested to send to THE IRON AGE two copies—one for the Catalogue Department in the New York Office and one for the Iron Age Library of Trade Literature in London.

NILES MFG. COMPANY, 14-16 North Canal street, Chicago, Ill.: Illustrated catalogue No. 15, of Spring Hinges, Lavatory Door Trimmings and Hardware specialties, for architects, Hardware dealers, plumbers and marble works.

JOHN E. SMITH'S SONS COMPANY, 50 Broadway, Buffalo, N. Y.: Illustrated catalogue C, 60 pages, of the Buffalo Silent Meat Chopper and Mixer, Lard Mixer, Kraut Cutter, Spice Mill, Steam Kettle and similar goods for packers, sausage makers, &c.

McKENNA BROS. BRASS COMPANY, Pittsburgh, Pa.: Supplementary catalogue showing special Brass and Nickel Supplies for offices and hotels, such as Brass Railings, Hat, Coat and Towel Racks, Cuspidors, Brass Hand Elevators, Desk Fixtures for electric light, Fire Extinguishers, &c.

L. H. MACE & Co., 111-117 E. Houston street, New York: Illustrated catalogue and price-list of Refrigerators. They also manufacture Wooden Ware, Children's Carriages and Toys, for which separate catalogues are issued.

A. TREDWAY & SONS HARDWARE COMPANY, Dubuque, Ia.: Spring circular No. 33, containing 112 illustrated descriptive pages of a large line of goods peculiar to Spring business, including Agricultural Tools in great variety, Grindstones, Post Hole Diggers, Drain Tools, Laying Tools, Sowers, Screen Goods and Nettings, Wooden Ware, Curry Combs, General Hardware, Scales, Fishing Tackle, Guns and Ammunition, Washing Machines, Paints, &c.

St. JOSEPH PUMP & MFG. COMPANY, St. Joseph, Mo.: Catalogue descriptive of the Perfection Water Elevator and Purifying Pump, the advantages and construction of which are fully set forth.

OTWAY COOPER, Urbana, Ohio, eight page illustrated folder circular of the Cooper Halter for horses, including Rope Ties and Halters, and some Web Halters not shown in regular catalogue of Rope Horse Goods.

SUPERIOR MFG. COMPANY, Ann Arbor, Mich.: Illustrated pamphlet catalogue, envelope size, of Ann Arbor Improved Gasoline Lamps.

NATIONAL TWIST DRILL & TOOL COMPANY, Detroit, Mich.: Catalogue of Reamers, Cutters, Drills, Counter Bores, &c. The company announce the completion of their factory, which is referred to as equipped with modern machinery and improved tempering process, only high-class workmen being employed. All tools are subjected to a most careful inspection and micrometer test. The company especially state that their tools are all cleared straight with a cup wheel, which produces a strong tooth. Besides the tools illustrated in the catalogue they make many different styles of special tools to order.

THE NATIONAL WRINGER & MFG. COMPANY, Canton, Ohio: Catalogue showing a variety of Clothes Wringers, including bench and ball bearing, wood or iron frames, the improved Royal Washer, &c.

THE NATIONAL SCREW & TACK COMPANY, Cleveland, Ohio: Catalogue with lists covering Wood Screws, Machine Screws, Cold Pressed Nuts, Stove Bolts, Stove Rods, Sink Bolts, Tire Bolts, Carriage and Machine Bolts, Coach Screws, Rivets, &c.

A. J. HARWI HARDWARE COMPANY, Atchison, Kan.: Catalogue of 128 pages showing a large variety of spring and Summer goods.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Price list of Loaded Shells for field and trap shooting.

PERFECT SLIDING DOOR COMPANY, Bridgeport, Conn.: Leaflet in which the merits and advantages of their Perfect Sliding Door are briefly set forth.

STAR BRASS WORKS, 152 E. Lake St., Chicago: Catalogue illustrating and describing at length their Star Whitewash, Cold Water Paint and Spraying Machines.

All their machines are referred to as heavily constructed of the best materials, those particularly adapted for the service each part is to perform in operation, and built for hard usage in the hands of unskilled labor.

MASBACH HARDWARE COMPANY, 117 Chambers street, New York: Revised edition of their illustrated catalogue of Hardware, Cutlery, and specialties sold at wholesale by them. It contains 138 pages, cloth bound in stiff covers, and is profusely illustrated, the arrangement being such as to display large assortments. There are many additions to the line, including Electrical Goods and Bath Room Fixtures.

JOHN ERNSDORFF IRON COMPANY, Dubuque, Iowa: Spring circular of steel and iron supplies for blacksmiths.

THE GRIFFIN MFG. COMPANY, Erie, Pa.: Catalogue illustrating Loose Pin Steel Butts, Strap and T-Hinges, Wagon End Gate Hinges, Hasps and Staples, Folding Brackets, Steel Shelf Brackets, Lavatory Brackets, Steel Drawer Pulls and Sash Lifters, Wrought Barrel Bolts, Barn Door and Hinged Barn Door Hangers and Track and Wrought Washers.

LOUDEN MACHINERY COMPANY, Fairfield, Iowa: Illustrated circulars devoted to self opening Ice Tongs, Feed and Litter Carriers, Dump Boxes for handling corn, improved Hay Rack Fittings, Overhead Switches.

WICKWIRE BROS., Cortland, N. Y.: Catalogue illustrating their manufactures, including Wire Cloth, Poultry Netting, Wire Goods, Wire Nails, Wire Staples, Steel Wire, Galvanized, Tinned, Coppered or Enameled, &c. Their Wire Cloth is manufactured in three grades, painted, galvanized and bronze, the latter being a more expensive cloth than either of the others, and being, it is stated, absolutely rust proof and unaffected by salt, air or gases.

MAJESTIC WIRE FENCING COMPANY, Detroit, Mich.: Catalogue of Farm and Lawn Fencing, Fence Stretchers, Gates, Ratchets, Steel Line and End Posts.

EASTERN GRANITE ROOFING COMPANY, Irving Building, New York: Pamphlet relative to their Perfected Granite Roofing, accompanied by a sample of this stone surfaced Roofing.

STUART & PETERSON COMPANY, Burlington, N. J.: Catalogues, No. 205 relating to Furnaces, Heaters, Ranges and Stoves; No. 206, Appliances for the use of chemists, druggists, bottlers, butchers, &c., and No. 209, Hollow Ware and Specialties.

OLIVER MFG. COMPANY, Chicago, Ill.: Catalogue of Wagon and Lifting Jacks, including Peerless, Giant Samson, New Samson, Improved Samson, Oliver, Practical, Klemm Stone, Weller and Wagon Bed Jacks.

HOLT-LYON COMPANY, Tarrytown, N. Y.: Circular illustrating, with prices, Holt's Improved Dover Egg Beaters, Lyon Egg Beaters and Cream Whips, the Cleaner Rug and Carpet Beater and Vrooman's Sanitary Sink Strainers.

AMERICAN LOCK NUT COMPANY, Oregon, Ill.: Printed matter illustrating Lightning Portable Punches and Bull Dog Lock Nuts.

NORTH BROS. MFG. COMPANY, Philadelphia: Circular illustrating and describing their line of Machine Ice Cream Freezers and Rapid Ice Breaker.

STEWART & ROMAINE MFG. COMPANY, 124 North Sixth street, Philadelphia: Catalogue illustrating and describing their line of Single and Double Expansion and Toggle Bolts, Star Drills, Cap and Bonnet Nuts and special Brass and Iron Bolts of all kinds.

BEALL BROS. AND BEALL SHOVEL COMPANY, Alton, Ill.: Catalogues, one showing Beall Bros.' line of Miners' Tools and, Miners' Supplies, and the other representing Beall Shovel Company's line of Shovels, Spades and Scoops. The manufacturers refer to their lines as now complete, so that they can make anything used by miners in the way of tools and supplies, and any pattern or kind of Shovel desired. In their Shovel line they direct special attention to their Silver King or Maynard pattern Shovel, which is referred to as of the very highest grade.

J. E. BOLLES IRON & WIRE WORKS, Detroit, Mich.: Circular No. 10, descriptive of their Wrought Iron Fire Escapes.

KEYSTONE FARM MACHINE COMPANY, York, Pa.: "A Book of Field Scenes," in which many views are given of the Hallock and Keystone Adjustable Cultivators at work in the field. These Cultivators are intended for working all crops.

MISCELLANEOUS NOTE.

Crescent Brand Sash Cord.

Samson Cordage Works, Boston, Mass., are now putting on the market their Crescent brand of solid braided sash cord, which is made of India hemp, a substitute for cotton in view of the high price of the latter. The company state that India hemp can be made into a solid braided cord at about the old price of cotton cord, and that it makes a very servicable cord, much more durable than the twisted article. The Crescent brand is offered in one size, about $\frac{1}{4}$ inch in diameter, and samples and prices will be sent on application.

Knife and Fork Tray.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., John H. Graham & Co., 113 Chambers street, New York, direct representatives, are making a new line of knife and fork trays, one of which, No. 60, is here shown. It is



Knife and Fork Tray.

made of oak, varnished, the box being set in posts grooved for the sides, and put together without nails. The dimensions of the tray are $7\frac{1}{2} \times 13$ inches, and it has a hard oil rubbed finish. The goods are packed 12 in a crate. They also make three other styles of weathered oak, hard oil rubbed finish and same dimensions.

Cross Level.

The Sawyer Tool Mfg. Company, Fitchburg, Mass., are making the cross level here illustrated. It is de-



Cross Level.

signed to level both ways on a surface, is made of iron, enameled, with polished ends. Its size is $2\frac{1}{2} \times 3 \times \frac{5}{8}$ inches.

Niagara Tubular Steel Breast Strap.

The Metal Stamping Company, Niagara Falls, N. Y., are manufacturing the Niagara tubular steel breast strap shown herewith. The main part is described as made of a flat piece of the best quality of open hearth or cold rolled steel. By means of cast steel dies in powerful



Niagara Tubular Steel Breast Strap.

presses it is put into the exact shape necessary best to serve its purpose, and makes a breast strap that is said to be strong, convenient and handsome. The company refer to the strap as a perfect substitute for leather breast straps, with center slide and snaps, while costing considerably less and lasting much longer. They state that it wears the collar far less than a leather breast strap, as the spread of the ball is such that any part rarely touches the collar, and if from an unusual side push it should chance to touch the collar, it would be the flat surface of a smooth link. It is also referred to as doing away with every objection applying to a breast chain.

Sterling Neverbreak Tack Claw.

The W. C. Browne Mfg. Company, Kingston, N. Y., are offering the tack claw shown herewith. The particular feature of the tool is the reinforced edges of the sheet metal claw, to prevent its straightening out or breaking off at the angle when submitted to severe strain. The sheet metal claw is thin enough to get under the heads of tacks, and the reinforced edges, the manufacturers remark, make the heretofore weakest part the strongest.



Sterling Neverbreak Tack Claw.

The tools are nickel finished, with polished handles, and are packed in display boxes.

JAMES P. MITCHELL of Reynolds, Ind., has invented a smokeless powder, which is to be tested by the army and navy departments at Washington. According to the claims made, smaller bore guns may be used with this powder, as it is said to have three times the explosive power of any powder now in use. It is described as not only smokeless, but odorless, and causing no recoil. It is claimed that it cannot be exploded by concussion, but only by a spark; that moisture does not destroy its explosive properties, and that, soaked in water, it is absolutely restored by ten minutes' drying. It is said that it will drive a bullet from a No. 3 Winchester through 36 inches of oak, 70 inches of pine or $\frac{1}{2}$ inch of steel plate at a range of 30 feet. A company has been organized and a plant is under contract at Monticello, Ind., to have a producing capacity of 1000 pounds daily.

Finch's Pin Ticket Marking Device.

Tucker & Dorsey Mfg. Company, Indianapolis, Ind., manufacturers of hardware and wooden ware specialties, for whom John H. Graham & Co. are selling agents, have added to their line Finch's patent pin ticket marking device, here shown. There are two parts, the board and sliding hand rest. The board is 9 x 16 inches in dimensions, has 12 grooves running crosswise, each of which holds 12 usual size pin tickets, or fewer of larger sizes.



Finch's Pin Ticket Marking Device.

The sliding hand rest prevents the lower tickets from being soiled or displaced by the coat or shirt cuff while marking upper row tickets. The use of this system serves as a check on error, as a row holding 12 tickets corresponds with each dozen of goods to be marked, and the individual can see at a glance how many dozens he has marked or may have to mark by knowing the number of blank tickets he starts with, irrespective of how many times he may be interrupted in his work. The board can be filled by the cash boy at leisure and always kept ready for use. An important advantage of this construction is that the tickets lie flat while being marked, as the pins are sunk into the grooves while the tickets lie on the board.

Machine Ice Cream Freezer.

With a view to meeting the demand for smaller sized machines for confectioners whose business is not large



Machine Ice Cream Freezer.

enough to warrant putting in 40-quart constructions, North Bros. Mfg. Company, Philadelphia, have added to their line machine freezers, with the Seaman style dasher,

14, 18, 24 and 32 quart sizes, and with Lightning style dasher, 14 and 20 quart sizes. An illustration of one of the freezers is given herewith. The cans, tubs, workmanship and material are referred to as the same as used in connection with other styles of machine freezers made by the company. The general design and the mechanism for engaging gearing with dasher are the same as in their combination freezer, but in the smaller size of the new machine the omission of belt shifter and an absence of provision to use different size apparatus interchangeably al-

low of a much less price than the same sizes in the combination freezer, and put a substantially built machine freezer of small capacity within reach of confectioners using power. The machines are furnished without pulleys or without fly wheels, if so desired, also with steel or copper cans.

The Peck Keg Truck.

A light nail keg truck, weighing only about ten pounds and intended for operation by one hand, is being placed on the market by the C. A. Peck Hardware Company,

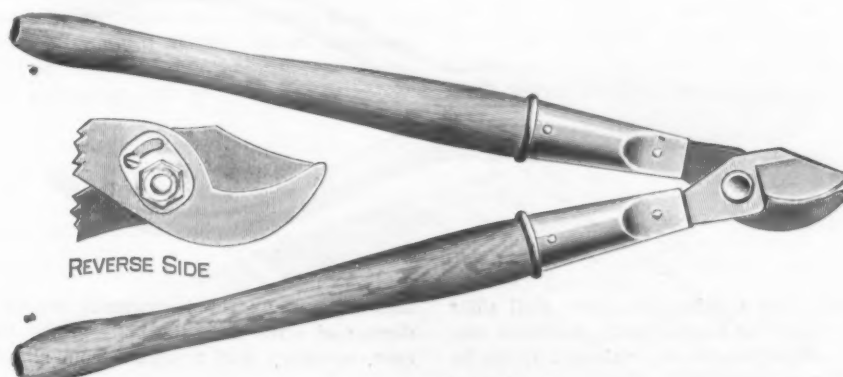


The Peck Keg Truck.

Berlin, Wis., as shown in the accompanying cut. An automatic latch in the center of the handle of the truck engages the top lip of the keg, holding it in position. The latch can be moved up or down, and locked in any position to suit the height of nail kegs, beer barrels, spools of wire, or smaller packages. The lock rises when the upper part of the keg is pressed against it, and falls of its own weight, engaging the lip of the keg. As the truck can be operated with one hand, the other hand is free to carry packages and parcels. It is not necessary to lift the keg in any manner. Larger sizes of trucks are also made for heavy barrels or casks. Mr. Peck, who is secretary of the Wisconsin Hardware Dealers' Association, is selling this truck to and through retail hardware dealers.

San Jose Pruning Shear.

The Cronk & Carrier Mfg. Company, Elmira, N. Y., are manufacturing the San Jose pattern pruning shear, as here illustrated. The shear is offered in three numbers,



San Jose Pruning Shear.

No. 109½ being 26 inches long, riveted, instead of having patent lock nut, and sold at a less price. No. 110, with lock nut, is the same length, No. 112 being made exactly as No. 110, except the length, which is 36 inches.

Glass Truing Plier.

The Smith & Hemenway Company, 296 Broadway, New York, are marketing the glass truing plier here il-

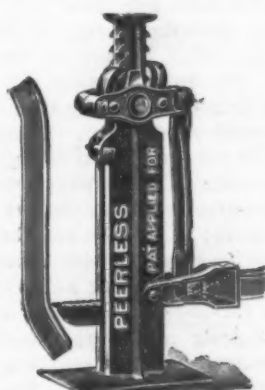


Glass Truing Plier with Inserted Jaws.

lustrated. Where this differs from similar pliers previously made is in the inserted jaws, which are of Wolfram steel, which from the greater hardness greatly increases the life of the pliers. The handles are of cast steel. The plier is made in a 10-inch size only, polished and blackened in oil.

The Peerless Jack.

A light, powerful lifting jack for automobiles, machinery, traction engines, threshers, &c., is being placed on the market by the Oliver Mfg. Company of Chicago, as shown in the accompanying illustration. Its operation is very simple. Working the handle below the center raises the load; above the center lowers the load, or the machine



The Peerless Jack.

may be reversed and worked below the center. It is also suited to pushing as well as lifting. It is made in four sizes, ranging from 7 to 25 pounds in weight and 2 to 10 tons in capacity.

Little National Combination Garden Cultivator.

Van Camp Hardware & Iron Company, Indianapolis, Ind., are marketing the Little National combination garden cultivator, here shown, for which they have

the exclusive sale. This cultivator, or plow, can be used with the hands only or by a body push in addition, as shown, there being a spring, not shown in the cut, which breaks the jar from the breast attachment. The shovels are adjustable for height or depth, and the cultivator can be supplied of either single or double construction. It will be seen the handles are attached to an iron extending beyond the axles, so that the pressure against the handles pushes this connection, which, in turn, pulls the

plow, thus making it a push-pull plow. The rods run at an angle with the handles in such a way that the imple-



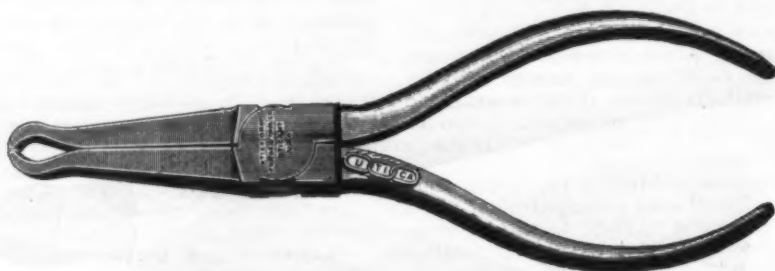
Little National Combination Garden Cultivator.

ment will not dig into the ground too far and make the work unnecessarily hard.

Heat Coil Plier.

The Utica Drop Forge & Tool Company, Utica, N. Y., represented by the Smith & Hemenway Company, 296

it, other features of an inside micrometer, it is stated, have not been omitted. The screw has a movement of $\frac{1}{2}$ inch, and has adjustment for wear, as has also the hardened anvil at the end of the thimble. The six rods



Heat Coil Plier.

Broadway, New York, are making the Heat Coil plier here illustrated, for replacing heat coils in electrical construction in repair work or new work, although it can be used equally well for gripping cylindrical rods or wire for any purpose. It is $5\frac{1}{2}$ inches long, with jaws $1\frac{1}{4}$ inches clear and $11\text{--}32$ inch wide. It is made in the black, with polished jaws, full polished, and nickel plated.

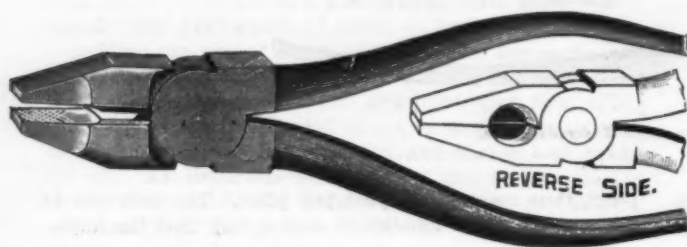
that accompany the instrument are ground to standard sizes, and screw into the body of the tool, assuring firmness, accuracy and freedom from slipping.

Cronk's Buck Shot Lineman's Plier.

The Cronk & Carrier Mfg. Company, Elmira, N. Y., have added to their line of pliers the Cronk's Buck Shot lineman's plier No. 80, here shown. The distinguishing feature of this plier is the round throat, shown in the subsidiary outline cut, for cutting large size insulated wire or cable without injuring the insulation. The plier is forged from tool steel and fully warranted. It is

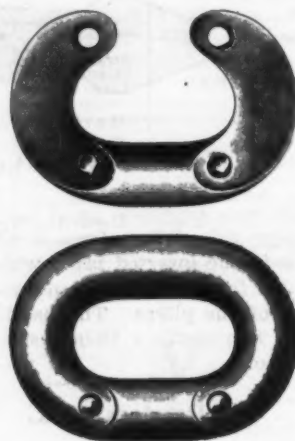
Acme Drop Forged Connecting or Repair Link.

The Marine Hardware & Equipment Company, South Portland, Me., are putting on the market the Acme drop forged connecting or repair link, as shown herewith, the upper cut showing one of the halves and the lower cut the link complete. It is referred to as made from a fine quality of forging steel from the solid piece without a weld. It is manufactured in all sizes from $\frac{1}{4}$ to 1 inch inclusive. The links are designed in general shape to be the same as the links of the different sizes of chain to which



Cronk's Buck Shot Linemen's Plier.

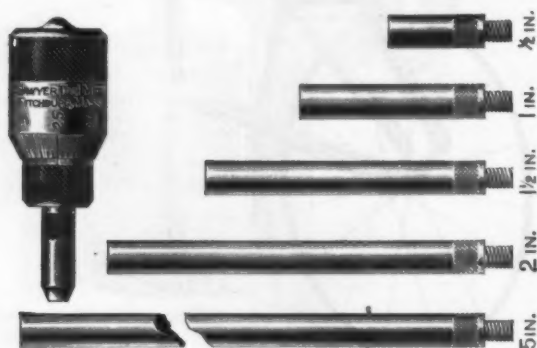
made in 5, 6, 7 and 8 inch sizes, finished both plain and nickel plated. The same plier, No. 800, is insulated for cutting live wires without gloves, and is made in 7 and 8 inch sizes only, plain finish.



Acme Drop Forged Connecting or Repair Link.

Inside Micrometer.

The Sawyer Tool Mfg. Company, Fitchburg, Mass., are manufacturing the inside micrometer shown full size in



Inside Micrometer, with Six Rods.

the accompanying illustration. While the micrometer is said to be the smallest manufactured for inside use, and compactness has been a chief consideration in designing

they correspond. Through tests they have been found, we are advised, to exceed the strength of the chain. The link is made in two halves, each half having at the heaviest part of the stock two small pins, which the two eyes in the other half drop over, effecting a complete union. These pins being a part of the forgings, and consequently of the same quality of stock, a few sharp blows will immediately close them up, making almost a complete solid welded link. These pins and eyes are on both sides of the link and in no way interfere with the bearing on the ends. The company refer to these links as valuable to manufacturers and dealers for completing short lengths of chain; to the mill and the mine operator, for connecting lengths of chain with manila or wire rope or other material where a strong union or connection is desirable; to the farmer, for repairing his trace chains, harvesting and logging machinery; to the lumberman, who finds it necessary to carry a smithing outfit to repair broken chains and to add new links. The links can also be adapted for connecting anchors and chains, moorings and other purposes about salt or fresh water. The links are put up in packages of an attractive character for shelf display, the labels being of the makers' own patent design. The links are also furnished in galvanized iron, finished in a very neat and attractive manner.

Can Openers—See Openers, Cans, Milk—

Illinois Pattern.	\$1.50	2.00	2.25	each.
Iowa Pattern.	2.35	2.50	each.	
New York Pattern.	1.65	2.40	2.75	each.
Baltimore Pattern.	1.80	2.00	each.	

Cans, Oil—

Buffalo Family Oil Cans:				
3	5	10	gal.	
\$48.00	\$4.20	\$2.00	gro.	net

Caps—Percussion—

Eley's E. B.	.....	60c
G. D.	.....	per M 3/4 to 35c
F. L.	.....	per M 40 to 45c
G. E.	.....	per M 50 to 55c
Musket.	.....	per M 65 to 68c

Primers—

Berdan Primers, \$2.00 per M.	.....	20c
B. L. Caps (Starveant Shear).	.....	\$2.50 per M
All other primers per M.	.....	\$1.50 to \$1.60

Cartridges—

Blank Cartridges:				
32 C. F.	\$5.50	.....	10c	5c
38 C. F.	\$7.00	.....	10c	5c
32 cal. Rim.	\$1.50	.....	10c	5c
32 cal. Rim.	\$2.75	.....	10c	5c
B. B. Caps, Conn. Ball Supt.	.....	\$1.00		
B. B. Caps, Round Ball.	.....	\$1.40		
Central Fire.	.....	25c		
Target and Sporting Rifle.	.....	15c to 10c		
Primer Shells and Bullets.	.....	15c to 10c		
Rim Fire Sporting.	.....	50c		
Rim Fire Military.	15c to 5c		

Cases, Show—

Sun, No. 105 Silent Salesman, 6 ft.	\$25.00
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Casters—

Bed.	70 to 70c
Plate.	60c to 60c
Philadelphia.	75 to 75c
Boss.	70c to 10c
Boss Anti-Friction.	.....	70c to 10c
Gen. (Roller Bearing).	.....	75c to 10c
Marlin's Patent (Phonix).	.....	45c
Smith & Hemenway Co.	.....	30c
Standard Ball Bearing.	.....	45c
Tucker's Patent low lat.	.....	80c
Yale (Double Wheel) low lat.	.....	45c

Cattle Leaders—

See Leaders, Cattle.

Chain, Coll—

American Coll. Jobbers' Shipments:				
3-16	3/4	5-16	3/4	7-16
8-16	5/8	1-15	3/8	2-15
3-5	3/8	5-5	1	1 to 1 1/4 inch.
German Coll.	.....	60c to 10c		
Halter Chains.	.....	60c to 10c		
German Halter Chains.	.....	60c to 10c		
Cow Ties.	.....	60c to 10c		

Trace, Wagon & C.

Traces, Wagon Standard.	.....	100 pair
6 1/2—6 1/2, Straight, with ring.	.....	\$24.00
6 1/2—6 1/2, Straight, with ring.	.....	\$24.50
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	.....	\$25.00
6 1/2—6 1/2, Straight, with ring.	\$25.00

Trace, Wagon and Fancy Chains.

Trace, Wagon and Fancy Chains.	60c to 10c
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Miscellaneous—

Jack Chain, list July 10, '93.	60c to 10c
Iron.	60c to 10c
Brass.	60c to 10c
Safety Chain.	.....	70c to 10c
Gal. Pump Chain.	.....	10c to 10c
Covert Mfg. Co.	.....	10c to 10c

Chalk—(From Jobbers.)

Carpenters' Blue.	.....	gro. 50c
Carpenters' Red.	.....	gro. 35c
Carpenters' White.	.....	gro. 30c

Checks, Door—

Hardley's.	.....	45c
Columbia.	.....	60c to 10c
Rollpoe.	.....	60c to 10c

Chests, Tool—

American Tool Chest Co.	.....	55c
Boys' Chests, with Tools.	.....	40c
Youths' Chests, with Tools.	.....	40c
Gentlemen's Chests, with Tools.	.....	40c
Farmers', Carpenters', etc., Chests.	.....	40c
with Tools.	.....	40c
Machinists' and Fitters' Chests.	.....	40c
Empty.	.....	40c
C. E. Jennings & Co.'s Machinists' Tool.	.....	40c
Chests.	.....	40c

Chisels—

Socket Framing and Firmer

Standard List.	.....	70c to 10c
Huck Bros.	.....	30c
Charles Buck.	.....	30c
C. E. Jennings & Co. Socket Firmer.	.....	80c to 10c
C. E. Jennings & Co. Socket Framing.	.....	80c to 10c
No. 15.	.....	80c to 10c
Swan's.	.....	70c
L. & L. J. White.	.....	30c to 30c

Tanged—

Tanged Firmers.	.....	40c to 10c
Black Bros.	30c
Charles Buck.	30c

C. E. Jennings & Co. Nos. 101, 181.

L. & L. J. White, Tanged.	16 1/2 to 10c
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Cold—

Cold Chisels, good quality.	13 to 15c
Cold Chisels, fair quality.	11 to 12c
Cold Chisels, ordinary.	.....	10 to 10c

Chucks—

Beach Pat., each \$8.00.	.....	30c to 5c
Pratt's Positive Drive.	.....	25c
Empire.	.....	25c
Blacksmiths'.	.....	25c

Skinner Patent Chucks—

Combination Lathe Chucks.	.....	40c
Drill Chucks, Patent and Standard.	.....	30c
Drill Chucks, New Model.	.....	30c
Independent Lathe Chucks.	.....	40c
Improved Planer Chucks.	.....	35c
Universal Lathe Chucks.	.....	40c
Face Plate Jaws.	.....	40c

Standard Tool Co.—

Improved Drill Chuck.	.....	45c
Union Mfg. Co.	.....	50c
Combination.	.....	50c
Czar Drill.	.....	35c
Combination Geared Scroll.	.....	40c
Geared Scroll.	.....	40c
Independent.	.....	40c
Independent Steel.	.....	45c
Union Drill.	.....	45c
Universal.	.....	50c
Independent Iron Face Plate Jaws.	.....	40c
Independent Steel Face Plate Jaws.	.....	40c

Westcott Patent Chucks—

Lathe Chucks.	.....	50c
Little Giant Auxiliary Drill.	.....	45c
Little Giant Double Grip Drill.	.....	45c
Little Giant Drill, Improved.	.....	45c
Oneda Drill.	.....	45c
Scroll Combination Lathe.	.....	45c

Clamps—

Adjustable, Hammer's.	.....	30 to 20c
Cabinet, Sargent's.	.....	50c to 10c
Carriage Makers', P. S. & W. Co.	.....	30c
Carriage Makers' Sargent's.	.....	40c
Best, Parallel.	.....	35c to 10c
Linemans' Utica Drop Forge & Tool Co.	.....	40c
Saw Clamps, See Vices, Saw Files.	.....

Cleaners, Drain—

Iwan's Champion, Adjustable.	.....	55c
Iwan's Champion, Stationary.	.....	40c

Sidewalk—

Star Socket, All Steel.	.....	40c to 10c
Star Shank, All Steel.	.....	40c to 10c
W. & C. Swanik, All steel, 7 1/2 in.	.....	\$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Foster Bros.	.....	30c
New Haven Edge Tool Co.	.....	45c
Fayette R. Plumb.	.....	35c to 35c
L. & L. J. White.	.....	30c

Clippers—

Chicago Flexible Shaft Company.	.....	\$3.75 to 10c
1902 Chicago Horse.	.....	\$10.75 to 10c
20th Century Horse, each.	.....	\$15.00 to 10c
Lightning Belt.	.....	\$15.00 to 10c
Chicago Belt.	.....	\$20.00 to 10c
Stewart's Patent Sheep.	\$18.50 to 10c

Finger Nail Clippers—

Smith & Hemenway Co.	doz. net \$2.00
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Clips, Axle—

Eagle and Superior 1/4 and 5-17	70c to 10c
inch.	70c to 10c
Norway, 1/4 and 5-16 inch.	70c to 10c

Cloth and Netting, Wire

—See Wire, etc.	
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Cocks, Brass—

Hardware list:	65c to 10c
Compression and Plain Bibbs.	65c to 10c
Globe, Kerosene, Racking, &c.	.....	65c to 10c
Cocks.	.....	65c to 10c

Coffee Mills—See Mills, Coffee.

Collars, Dog—

Brass, Walter B. Stevens & Son's list.	.....	40c
Embossed, I. Gilt, Walter B. Stevens & Son's list.	.....	30c to 10c
Leather, Walter B. Stevens & Son's list.	40c

Combs, Curry—

Metal Stamping Co.	30c to 10c
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Mane and Tail—

Covert's Saddlery Works.	60c to 10c
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Compasses Dividers, &c.

Ordinary Goods.	75c to 10c
Bemis & Call Haw. & Tool Co.	65c
Calipers, Double.	65c
Calipers, Inside or Outside.	.....	65c
Calipers, Wing.	60c
Compasses.	50c

Compressors, Corn Shock—

J. B. Hughes' 1/2 doz.	\$2.50
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Conductor Pipe, Calva.—

L. C. L. to Dealers:		
Territory.	Nested.	Not nested.
A. Eastern.	75c to 10c	75c to 10c
B. Eastern.	75c to 10c	75c to 10c
Central.	75c to 10c	75c to 10c
Southern.	75c to 10c	75c to 10c
S. Western.	75c to 10c	75c to 10c
Terms, 60 days, 2% cash, 10 days.	.....	Factory
shippers generally delivered.	.....

Coolers, Water—

Gal. each.	3	4	6	8
L. Brador \$1.50	\$1.50	\$1.50	\$2.10	2.70
Gal.	8			
Iceland, ea. \$1.80	\$2.10	2.40	\$3.00	
Gal.	2	3	4	6
Galv. Lined Ea. \$1.85	\$2.00	\$2.2	\$2.90	\$3.90
Galv. Lined side handles	25c		
Each, \$1.35	\$2.15	\$2.40	\$3.30	\$4.15, 25c

Coopers' Tools—

See Tools, Coopers'.	
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Cord—

Braided, Drab.	10c to 10c
Braided, White, Com.	10c to 10c
Cable Laid Italian.	10c to 10c
Common India.	.....	10c to 10c
Cotton Sash Cord, Twisted.	.....	10c to 10c
Patent Russia.	.....	10c to 10c
Cable Laid Russia.	.....	10c to 10c
India Hemp, Twisted.	.....	10c to 10c
Patent India, Twisted.	.....	10c to 10c

Anniston Cordage Co. Braided Cotton.

Old Glory, Nos. 7 to 12.	.....	20c to 10c
Anniston, Nos. 7 to 12.	.....	20c to 10c
Old Colony, Nos. 7 to 12.	.....	20c to 10c
Anniston Drab, Nos. 7 to 12.	.....	20c to 10c
Pearl Braided, cotton, No. 6 1/2 to 24.	.....	20c to 10c
Nos. 7 to 12 24.	.....
Eddystone Braided Cotton, No. 6 1/2 to 27.	.....	20c to 10c
Harmony Cable Laid Italian, No. 7 to 10.	.....	20c to 10c

Peeries—

Cable Laid Italian.	.....	16c
Cable Laid Russian.	.....	14c
Cable Laid India.	.....	12c
Braided India.	.....	12c

Samson, Nos. 7 to 12:

Braided, Drab Cotton.	.....	20c to 10c
Braided, Italian Hemp.	.....	20c to 10c
Braided, Linen.	.....	20c to 10c
Braided, White Cotton or Spot.	.....	20c to 10c
Massachusetts, White.	.....	20c to 10c
Massachusetts, Drab.	.....	20c to 10c
Phoenix, White, No. 7 to 12.	.....	20c to 10c
No. 6 cords, 1/2 extra.	.....	20c to 10c

A quality, Drab.

A quality, White.	.....	40c
B quality, Drab.	.....	35c
B quality, White.	30c
Italian Hemp.	40c
Linen.	57c

Wire, Picture—

List Oct., '00.	85c to 10c
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Cradles—

Grain.	10c to 10c
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Crays—

White Round Crays, gross 5 1/2 to 6c	
Cases, 100 gro. \$4.00, at factory.	
D. M. Steward Mfg. Co.	30c

Crays, Crayons.

Crays, Crayons.	30c
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Crays, Crayons.

Crays, Crayons.	30c
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Forks—

Base Discounts Aug. 1, 1899, list:

Hay, 3 tine.....	50¢@10¢5
Boys' & Fish, 3 tine.....	50¢@10¢5
Hay & Boys, 3 tine.....	60¢5
Hay & Boys, 4 tine.....	60¢5
Champion Hay.....	60¢5
Hay & Header, long 3 tine.....	60¢5
Header, 4 tine.....	60¢5
Barley, 4 & 5 tine, Steel.....	60¢5
Manure, 4 tine.....	60¢15¢5
Manure, 5 and 6 tine.....	60¢25¢5
Spading.....	70¢25¢5
Potato Digger, 6 tine.....	60¢15¢5
Sugar Beet.....	40¢10¢5
Coke & Coal.....	40¢10¢5
Havy Mill & Street.....	60¢5
Iowa Dig-Easy Potato.....	60¢5
Victor, Hay.....	60¢5
Victor, Manure.....	60¢5
Victor, Header.....	60¢5
Champion, Hay.....	60¢5
Champion, Manure.....	60¢5
Columbia, Hay.....	60¢5
Columbia, Manure.....	70¢5
Columbia, Spading.....	70¢10¢5
Hawkeye Wood Barley 4 tine 5 doz.	\$3.00; 6 time, \$5.00, 60¢15¢5
W. & C. Potato Digger.....	60¢12¢5
Acme Hay.....	60¢10¢5
Acme Manure, 4 tine.....	60¢20¢7¢5
Dakota Header.....	60¢15¢5
Jackson Steel Barley.....	60¢15¢5
Kansas Header.....	60¢5
W. & C. Favorite Wood Barley 4 time, 5 doz., \$5.00; 6 time, \$6.00	
Plated.—See Spoons.	

Fountains, Stock—

Double Dewey.....	5 doz. \$13.00
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Frames—Saw—

White, Straight Bar, per doz.	75¢@90¢
Red, Straight Bar, per doz.	\$1.00@1.15
Red, Double Brace, per doz.	\$1.40@1.50

Freezers Ice Cream—

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse—

Hemp.....	Per 1000 Feet.
Cotton.....	3.30
Waterproof Single Taped.....	3.55
Waterproof Double Taped.....	4.50
Waterproof Triple Taped.....	5.15

Gates, Molasses and Oil—

Stebbins' Pattern.....	30¢5@80¢10¢5
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Gauges—

Marking, Mortise, etc.

Chapin-Stephens Co.	50¢10¢5@50¢10¢10¢5
Marking, Mortise, etc.	50¢10¢5@50¢10¢10¢5
Scholl's Patent.....	50¢10¢5@50¢10¢10¢5
Door Hangers.....	50¢10¢5@50¢10¢10¢5
Fulton's Butt Gauge.....	50¢10¢5@50¢10¢10¢5
Stanley R. & L. Co.'s Butt & Banet Gauge.....	50¢10¢5@50¢10¢10¢5
Wire, Brown & Sharpe's.....	50¢10¢5@50¢10¢10¢5
Wire, Morse's.....	50¢10¢5@50¢10¢10¢5
Wire, P. S. & W. Co.....	50¢10¢5@50¢10¢10¢5

Gimlets—Single Cut—

Nail, Metal, Assorted, gro.	\$1.10@1.50
Spike, Metal, Assorted, gro.	\$2.30@3.00
Nail, Wood Handled, Assorted, gro.	\$1.75@2.50
Spike, Wood Handled, Assorted, gro.	\$1.25@1.50

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co.....	60¢@60¢10¢10¢5
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Glue-Liquid Fish—

Bottles or Cans, with Brush.....	25¢@50¢
Cans (1/2 pts., pts., qts., 1/2 gal., gal.).....	25¢@50¢
International Glue Co. (Martin's).....	40¢10¢5@50¢

Grease, Axle—

Common Grade.....	gro. \$1.70@5.50
Dixon's Everlasting.....	10-b pails, ea. \$5.00
Dixon's Everlasting, in bxs.	5 doz. 1 b. \$1.30; 2 b. \$2.00

Grips, Nipple—

Perfect Nipple Grips.....	40¢10¢25
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Griddles, Soapstone—

Pike Mfg. Co.....	33¢@33¢10¢5
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Grindstones—

Bicycle Emery Grinder.....	\$6.50
Bicycle Grindstones, each.....	\$2.50@3.00
Pike Mfg. Co.....	
Improved Family Grindstones.....	per inch, per doz. \$2.00
Pike Mfg. Co. Knife and Tool.....	Grinder, each, \$5.00
Velox Ball Bearing, mounted, Angle Iron Frames.....	each, \$3.25

Halters and Ties—

Web.....	45¢25
Jute Rope.....	40¢5¢5
Sisal Rope.....	20¢25
Covert's Saddlery Works:	
Web and Leather Halters.....	70¢
Jute and Manila Rope Halters.....	70¢
Sisal Rope Halters.....	70¢
Jute, Manila and Cotton Rope Ties.....	70¢
Sisal Rope Ties.....	60¢10¢5

Hammers—

Handled Hammers—

Heller's Machinists'.....	40¢10¢5@40¢10¢10¢5
Heller's Farriers.....	40¢10¢5@40¢10¢10¢5
Magnetic Tack, Nos. 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000	
Peck, Stow & Wilcox.....	40¢10¢5@40¢10¢5
Payette E. Plumb.....	40¢10¢5@40¢10¢5
Plumb, A. E. & Son.....	40¢10¢5@40¢10¢5
Engineers' & B. S. Hand.....	40¢10¢5@40¢10¢5
Machinists' Hammers.....	40¢10¢5@40¢10¢5
Beveling and Planers.....	40¢10¢5@40¢10¢5

Sargent's C. S. New List.....

Heavy Hammers and Sledges—

Under 5 lb.....	to 50¢
5 to 10 lb.....	to 80¢
Over 10 lb.....	to 1.00
Wilkinson's Smitas.....	94¢@10¢10

Handles

Agricultural Tool Handles—

Axe, Pick, etc.....	40¢50¢5
Hoe, Rake, etc.....	40¢50¢5
Fork, Shovel, Spade, etc.....	40¢50¢5

Long Handles.....

D Handles.....

Cross-Cut Saw Handles—

Atkins.....	40¢50¢5
Champion.....	45¢45¢10¢
Disston.....	50¢

Mechanics' Tool Handle.....

Auger, assorted.....	gro. \$2.50@2.55
Bradawl.....	gro. \$1.55@1.60
Chisel Handles:	
Apple Tanged Firmer, gro. ass'd.	\$1.10@1.25
Hickory Tanged Firmer, gro. ass'd.	\$2.15@2.40
Apple Socket Firmer, gro. ass'd.	\$1.75@1.95
Hickory Socket Firmer, gro. ass'd.	\$1.15@1.60
Hickory Socket Framing, gro. ass'd.	\$1.60@1.75

File, assorted.....

Hammer, Hatchet, Axe, etc.....	5¢
Hand Saw, Varnished, doz.	80¢85¢
Not Varnished.....	85¢75¢

Plane Handles:

File, assorted.....gro.	\$1.30@	\$1.40
Hammer, Hatchet, Axe, &c.....	50¢	
Hand Saw, Varnished, doz.	80@	85¢

Chapin-Stephens Co.

Carving Tool.....	40¢40¢10¢
Chisel.....	60¢60¢10¢
File and Awl.....	60¢60¢10¢
Saw and Plane.....	40¢40¢10¢
Screw Driver.....	40¢40¢10¢
Millers Falls Adj. and Ketchet Auger Handles.....	15¢10¢
Nicholson Simplicity File Handle.....	50¢

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, etc.

Barn Door, New Pattern, Round Groove, Regular:

Inch.....	3 4 5 6 8 10
Single Doz.....	\$0.90 1.25 1.60 1.95 2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch.....	3 4 5 6 8 10
Single Doz.....	\$1.30 1.85 2.50 3.00

Allith Mfg. Co.

Reliable No. 1.....	per d. \$1.00
Reliable No. 2.....	per doz. \$15.00

Chapin-Stephens Co.

Friction.....	25¢
Oscillating.....	25¢
Big Twin.....	25¢
Chisholm & Moore Mfg. Co.....	50¢
Baggage Car Door.....	50¢
Elevator.....	50¢
Railroad.....	50¢
Cronk & C. Miller Mfg. Co.....	50¢
Loose Axle.....	60¢
Roller Bearing.....	60¢10¢5

Lane Bros. Co.

Parlor, Ball Bearing.....	\$4.15
Parlor, Standard.....	\$3.35
Parlor, New Model.....	\$2.75
Parlor, New Champion.....	\$2.25
Barn Door, Standard.....	50¢10¢5
Hinged.....	60¢
Covered.....	50¢10¢10¢5
Special.....	50¢10¢10¢5

Lawrence Bros.

Advantage.....	90¢
Cleveland.....	60¢10¢5
Crown.....	60¢
New York.....	50¢10¢5
Peerless.....	60¢10¢5
Sterling.....	60¢
Swing, No. 9.....	60¢
Union, No. 44, \$5.00; No. 45 \$7.00; No. 46, \$9.00.	

McKinney Mfg. Co.

No. 1, Special, \$15.....	60¢10¢5
No. 2, Standard, \$15.....	60¢10¢5
Hinged Hangers, \$15.....	60¢
Meyers' Station Hangers.....	60¢
C. S. Smith Mfg. Co.....	50¢10¢5
Lundy Parlor Door.....	50¢10¢5
Monarch Barn Door.....	50¢10¢5
Never Jam Hinge.....	50¢10¢5
Perfection.....	60¢10¢5
Phenix.....	70¢5
Warner's Adjustable.....	70¢10¢5
Warehouse Anti-Friction.....	60¢

Richards Mfg. Co.

Pioneer Wood Track No. 8.....	\$2.25
Imp'd Wood Track No. 5.....	\$2.25
Imp'd Steel Track No. 7.....	\$2.70
Imp'd Steel Track No. 9.....	\$2.70
Ball Brg Steel Track No. 10.....	\$2.50
Roller Brg Steel Track No. 11.....	\$2.40
Roller Brg Steel Track No. 12.....	\$2.40
Ball Brg Steel Track No. 13.....	\$2.35
Roller Brg Steel Track No. 14.....	\$2.35
Ball Brg Trolley Track No. 15.....	40¢
Ball Brg Trolley Track No. 19.....	40¢5
Ball Bearing Tandem Trolley Track No. 16.....	40¢
Silent Adjustable Track No. 18.....	40¢
Auto Adjustable Track No. 22.....	40¢
Trolley B. D. No. 17.....	\$1.00
Trolley F. D. No. 120.....	\$2.70
Trolley F. D. No. 121.....	\$2.35
Trolley F. D. No. 131.....	\$3.00
Roller Bearing D. D. No. 25.....	70¢5
Anti Friction U. S. B. D.....	70¢5
Ives' Wood Track No. 1.....	\$2.15
Ives' Imp'd Wood Track No. 2.....	\$2.15

Safety Door Hanger Co.

Storm King Saffety.....	60¢
U. S. Standard Hinge.....	0¢5
Stowell Mfg. and Foundry Co.....	40¢
Acme Parlor Ball Bearing.....	40¢
Ajax Hinge Door.....	50¢10¢5
Apex Parlor Door.....	50¢10¢5
Atlas.....	90¢

Passage "ar Door.....

Climax Anti-Friction.....	50¢10¢5
Elevator.....	40¢
Express.....	50¢
Freight Car Door.....	60¢
Interstate.....	60¢10¢5
Lundy Parlor Door.....	50¢10¢5
Magic.....	60¢10¢5
Matchless.....	60¢10¢5
Nansen.....	70¢5
Parlor Door.....	50¢10¢5
Railroad.....	50¢10¢5
Rex Hinge Door.....	60¢
Street Car Door.....	50¢
Steel, Nos. 300, 404, 500.....	50¢10¢5
Underwriter's Fire Door.....	50¢
Wild West Warehouse Door.....	50¢
Zenith for Wood Track.....	50¢10¢5

A. L. Swett Iron Works:

Eagle.....	60¢10¢5
Hylo.....	50¢10¢5
Perfection.....	50¢10¢5
Pilot.....	60¢
Taylor & Bogzla "Fly Co's Kidder's Roller Bearing.....	50¢15¢10¢45¢

Wilcox Mfg. Co.

Blake Roller Bearing.....	60¢10¢5
C. J. Roller Bearing.....	60¢10¢5
Cleto Roller Bearing.....	60¢10¢5
Dwarf Ball Bearing.....	40¢
Ives, Wood Track.....	60¢10¢5
L. T. Roller Bearing.....	60¢10¢5
New Era Roller Bearing.....	50¢10¢5
O. K. Roller Bearing.....	60¢10¢5
Prindle Wood Track.....	60¢
Richards' Wood Track.....	60¢
Richards' Steel Track.....	60¢10¢5
Spencer Roller Bearing.....	60¢10¢5
Tandem Nos. 1 and 2.....	60¢
Underwriters' Roller Bearing.....	40¢
Velvet.....	50¢
Wilcox Auditorium Ball Bearing.....	50¢
Wilcox New Century.....	60¢
Wilcox Elev. Door, Nos. 112 and 122.....	50¢
Wilcox Elev. Door, No. 132.....	40¢
Wilcox Fire Trolley Roller Bearing.....	30¢
Wilcox Le Roy Noiseless Ball Bearing.....	40¢
Wilcox New Century.....	60¢10¢5
Wilcox O. K. Steel Track.....	50¢
Wilcox O. K. Trolley.....	30¢
Wilcox Trolley Ball Bearing.....	40¢
Wilcox Wideman Narrow Gauge Ball Bearing.....	40¢

For Track, see Rail

Hangers, Garment—

Western, W. G. Co.....	70¢10¢5
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Myers' Patent Gate Hangers, 5 doz.

net 4.50

Hasps—

McKinney's Perfect Hasp, 5 doz.....	50¢
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Hatchets—

Regular list.....	40¢@50¢
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Heaters, Carriage—

Clark, No. 2, \$2.25; No. 3, \$2.75; No. 4, \$3.25; No. 5, \$3.75; No. 6, \$4.25; No. 7, \$4.75; No. 8, \$5.25; No. 9, \$5.75; No. 10, \$6.25; No. 11, \$6.75; No. 12, \$7.25; No. 13, \$7.75; No. 14, \$8.25; No. 15, \$8.75; No. 16, \$9.25; No. 17, \$9.75; No. 18, \$10.25; No. 19, \$10.75; No. 20, \$11.25; No. 21, \$11.75; No. 22, \$12.25; No. 23, \$12.75; No. 24, \$13.25; No. 25, \$13.75; No. 26, \$14.25; No. 27, \$14.75; No. 28, \$15.25; No. 29, \$15.75; No. 30, \$16.25; No. 31, \$16.75; No. 32, \$17.25; No. 33, \$17.75; No. 34, \$18.25; No. 35, \$18.75; No. 36, \$19.25; No. 37, \$19.75; No. 38, \$20.25; No. 39, \$20.75; No. 40, \$21.25; No. 41, \$21.75; No. 42, \$22.25; No. 43, \$22.75; No. 44, \$23.25; No. 45, \$23.75; No. 46, \$24.25; No. 47, \$24.75; No. 48, \$25.25; No. 49, \$25.75; No. 50, \$26.25; No. 51, \$26.75; No. 52, \$27.25; No. 53, \$27.75; No. 54, \$28.25; No. 55, \$28.75; No. 56, \$29.25; No.

Wire Goods Co:

Arame	.....	40¢10%
Chief	.....	70¢10%
Crown	.....	70¢10%
Czar	.....	65%
V Brace	.....	70¢1%
Cash Harness	.....	50¢10%

Wrought Iron—

Box, 6 in., per doz.	\$1.00; 8 in., \$1.25;
10 in., \$2.50.	
Cotton doz. \$1.05@1.25

Wrought Staples, Hooks, &c.—

See Wrought Goods.	
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Miscellaneous—

Bush, Light, doz.	\$5.50; Medium, \$6.50
Grass, Nos. 1, 2, 3, 4	
Best \$1.50 1.75 2.00
Common	..... \$1.50 1.50 1.50 1.50
Potato and Manure	..... 60¢15%
Wh. fletree	..... 10. 54¢5c
Hooks aka Eyes:	
Brass	..... 60¢10¢10¢70%
Malleable Iron	..... 70¢5¢70¢11%
Covert Saddlery Works, Self Looking	
Gate and Door Hooks	..... 80%
Ft. Madison Cut-Easy Corn Hooks	
.....	per doz. \$5.26 net

Bench Hooks—See Bench Stops.

Corn Hooks—See Knives, Corn.

Horse Nails—See Nails, Horse.

Horsehoes—See Shoes, Horse.

Hose Rubber—

Garden Hose, 3/4-inch:	
Competition	..... ft. 4 1/2¢ 5 c
3-ply Standard	..... ft. 6 1/2¢ 7 c
4-ply Standard	..... ft. 7 1/2¢ 8 c
3-ply extra	..... ft. 8 1/2¢ 9 c
1-ply extra	..... ft. 10 10¢4c
Cotton Garden, 3/4-in., coupled:	
Low Grade	..... ft. 6 67 c
Fair quality	..... ft. 8 69 c

Irons—Sad—

From 4 to 10	..... lb. 2 1/2¢ 3 c
B. B. Sad Irons	..... lb. 3 1/2¢ 3 1/2¢
Chinese Laundry	..... lb. 4 1/2¢ 5c
Chinese Sad	..... lb. 4 1/2¢ 4c
Mrs. Potts, per set:	
Nos.	50 55 60 65
Japd Tops	71 68 81 78
Tind Tops	74 71 84 81
New England Pressing, lb.	3 1/2¢ 4c

Pinking—

Pinking Irons doz. 60¢60c
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Soldering—

Soldering Coppers 3/4 and 5/8 19¢20c
1 1/4 and 2 21¢22c

Jacks Wagon—

Covert Mfg. Co.:	
Auto Screw	..... 30¢45c
Steel	..... 45¢2c
Covert's Saddlery Works:	
Daisy	..... 60¢10c
Victor	..... 60¢10c
Lockport	..... 60¢10c
Lane's Steel	..... 30¢10c

Kettles—

Brass, Spun, Plain	..... 30¢25%
Enamelled and Cast Iron—See Ware.	
Hollow	

Knives—

Butcher, Kitchen, &c.—	
Foster Bros. Butcher, &c.	..... 30%
Smith & Hemenway Co.	..... 40¢10c
Wilkinson Shear & Cutlery Co.	..... 30%
Hay and Straw—See Hay Knives.	

Corn—

Withington Acme, per doz.	\$2.65; Dent, \$2.75; Adl. Serrated, \$2.80; Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.	

Drawing—

Standard List	..... 70¢5¢70¢10%
Bradley's	..... 35 c
C. E. Jennings & Co. Nos. 45, 46	..... 60¢10%
Jennings & Griffin, Nos. 51, 52, 60, 10¢10%	
Swan's	..... 70¢10¢24c
Watrous	..... 10¢10c
L. & J. White	..... 30¢25%

Hay and Straw—

Lightning	..... per doz. \$5.50@7.00
Iwan's Slick Edge	..... per doz. \$10.10
Iwan's Serrated per doz. \$10.00
Maine per doz. \$8.50

Mincing—

Buffalo per gro. \$13.00
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Miscellaneous—

Farriers doz. \$3.00@3.25
Wostenholm's per doz. \$3.00@3.25

Knobs—

Base, 3/4-inch, Birch, or Maple,	
Rubber tip, gro.	..... \$1.10@1.15
Carriage, Jap. all sizes, gro.	..... 40¢45c
Door, Mineral	..... doz. 65¢70c
Door, Por. Jap'd	..... doz. 70¢75c
Door, Por. Nickel	..... doz. \$2.05@3.15
Hardley's Wood Door, Shutter, &c.	..... 15%
Picture, Sargent's	..... 60¢10¢10%

Lacing Leather—

See Belting Leather—

Ladders, Step, Etc.—

Lane's Store	..... 95%
Myers Noisels Store Ladders	..... 30%

Ladies' Melting—

L. & J. Mfg. Co., Low List	..... 25%
P. S. & W.	..... 60%
Reading	..... 45¢10%
Sargent's	..... 45¢10%

Lanterns—Tubular—

Regular Tubular No. 0, doz.	\$4.35@4.75
Light Tubular, No. 0, doz.	\$4.75@5.25
Hinge Tubular, No. 0, doz.	\$4.75@5.25
Other Styles	..... 40¢10¢10¢10%

Bull's Eye Police—

No. 1, 2 1/4 inch	..... \$3.50@3.75
No. 2, 3 inch	..... \$2.75@3.00

Lasts and Stand Shoe—

Stowell's Atlas, Malleable Iron	..... 50%
Stowell's Badger, Cast Iron	..... 50%

Latches—

Thumb—

Reggin's Latches, with screws, doz. \$3.50@4.00

Leaders Cattle—

Small, doz. 55c; large, doz. 60c

Covert Mfg. Co., doz. 55c

Lifters, Transom—

R & E 33¢45c
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Lines—

Wire Clothes, Nos. 18 19 20	
100 feet \$2.20 2.00 1.65
75 feet \$1.80 1.70 1.50

Samson Cordage Works:

Solid Braided Chalk, No. 0 to 3	..... 40%
Silver Lake Braided Chalk, No. 0, \$6.00;	
No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50	

Masson's Lines, Shade Cord, &c.:	
White Cotton, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2, \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75; Linen, No. 3 1/2, \$2.50; No. 4, \$3.00; No. 4 1/2, \$3.50	

Tent and Awning Lines: No. 5, White	
Cotton, \$7.50; Drab Cotton, \$8.50;	
Clothes Lines, White Cotton: 50 ft., \$2.75;	
60 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00;	
80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25	

Aniston Waterproof Clothes, 50 ft.,	
gro., \$36.00; Gilt Edge, \$34.00; Air Line	
\$24.00; Acme, \$19.00; Alabama, \$17.00;	
Empire, \$13.00; Advance, \$15.00; Ori-	
ole, \$22.00; Albermarle, \$15.00; Eclipse,	
\$18.50; Chicago, \$12.50; Standard,	
\$11.00; Columbia, \$9.50.	

Locks—Cabinet—

Cabinet Locks 33¢45¢75%
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[Net prices are very often made on these goods.]

Reading Hardware Co. 50%
R. & E. Mfg. Co. 40%
Sargent & Co. 40¢10%
Stowell's Steel Door Latches 50%

Elevator—

Stowell's 50%
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Padlocks—

Wrought Iron 75¢10¢5¢80¢5%
R. & E. Mfg. Co. Wrt. Steel and Brass 75¢75¢10%

Sash, &c.—

Ives Patent:	
Brass and Brass	..... 62¢45c
Crescent	..... 50%
Iron	..... 62¢45c
Wrought Bronze and Brass	..... 50%
Wrought Steel	..... 50%
Reading	..... net 50%

Machines—Boring—

Com., Upright, Without Augers	..... \$2.00
Com., Angular, Without Augers	..... \$2.25

R. & E. Mfg. Co.:	
Improved No. 3	\$4.35 No. 1 \$5.00
Improved No. 4	3.75 No. 2 3.35
Improved No. 5	2.75 No. 1, 3.50
Jennings	No. 4, 3.15 No. 1, 3.50
Millers' Pat.	2.50 2.75
Snell's, Rice's	2.50 2.75

Corking—

Reisinger Invinible Hand Power per doz. \$48.00
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Fence—

Williams' Fence Machines each, \$5.50
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Hoisting—

Moore's Anti-Friction Differential Pul-	
ley Block 30%
Moore's Hand Hoist, with Lock Brake 20%

Ice Cutting—

Chandler's 15¢10%
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Washing—

Boss Washing Machine Co.:	
Per doz.	
Boss No. 1; Boss Rotary \$57.00
Boss No. 2; Dietz Rotary \$60.00
Champion Rotary; Banner No. 1	..... \$54.00
Standard Champion No. 1	..... \$48.00
Standard Perfection	..... \$26.00
Cinti Square Western	..... \$30.00
Uneda American, Round	..... \$29.00

Mallets—

Hickory	..... 45¢50%
Lignumvita	..... 45¢50%
Timbers, Hickory and Applewood,	
doz. 50¢55c

Mashers, Vegetable—

Western, W. G. Co., Potato 60¢10%
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Mats—Door—

Elastic Steel (W. G. Co.) 10%
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Mattocks—

See Picks and Mattocks.	
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Milk Cans—See Cans, Milk

Mills—Coffee, etc.—

Kuteprie Mfg. Co. 25¢30%
National, List Jan. 1, 1902 30%
Parker's Columbian Victoria	..... 50¢10¢60%
Parker's Box and Side	..... 50¢10¢60%
Sun, No. 108, 1 1/2 mill	..... per doz. \$3.00
Swift, Lane Bros Co.	..... 30%

Mowers, Lawn—

Net prices are generally quoted.	
Cheap	..... all sizes, \$1.50@1.95
Good	..... all sizes, \$2.25@3.50

High Grade 4 1/2 4 3/4 5 5 1/2 6 6 1/2

Continental	..... 70¢85%
Great American	..... 70%
Great American Ball Bearing, new list	..... 70%
Quaker City	..... 70%
Pennsylvania	..... 60¢5%
Pennsylvania, Jr., Ball Bearing	..... 60%
Pennsylvania Golf	..... 50%
Pennsylvania Horse	..... 50¢5%
Pennsylvania Pony	..... 40¢5%
Philadelphia:	
Styles M. S. C. K. T.	..... 70¢85%
Style A, all Steel	..... 60¢5%
Style E, High Wheel	..... 70¢10¢5%
Drexel and Gold Coin, low list	..... 40¢5%

Mats—

Cut and Wige. See Trade Report.	
Wire Nail: and Brads, Papered.	
List July 30, 1899	..... 85¢10¢10¢90%

Hungarian, Finishing, Upholster-	
ers, &c. See Tacks.	

Horse—

Nos. 6 7 8 9 10	
A. C.	25 29 29 21 21 40¢25%
C. R. K.	25 29 29 21 21 40%
Champion	25 29 29 21 21 50%
Maud's	25 29 29 21 21 50%
Putnam	25 29 29 21 21 50%
New	10 18 17 18 16 10¢10%

Jobbers' special brands, per lb.	8¢34c
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Picture—

1 1/2 2 2 1/2 3 3 1/2 in.	
Brass Head	45 50 70 85 1.00 gro.
Por. Head	1.10 1.10 1.10 1.10 gro.

Nippers, See Pliers and Nippers.

Nuts—

Cold Punched:	
Mfrs. or U. S. Standard.	Off list.

Square, plain	..... \$5.10
Hexagon, plain	..... \$5.60
Square, C. T. & R.	..... \$5.50
Hexagon, C. T. & R.	..... \$5.00

Hot Pressed:

Mfrs. U. S. or Nar. Gauge Stan'd.	
Square Blank	..... \$8.00
Hexagon Blank	..... \$6.50
Square Tapped	..... \$6.00
Hexagon Tapped	..... \$5.10

Oakum—

Best or Government	..... lb. 6 1/2c
Navy	..... lb. 4 1/2c
U. S. Navy	..... lb. 5 1/2c
Plumbers' Spun Oakum	..... 2 1/2c
In carload lots 1/4 lb. off f.o.b. New York.	

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper	..... 60¢10%
Tin or Steel	..... 70¢10¢75%
Zinc	..... 65¢10%

Chase or Paragon:

Brass and Copper	..... 45¢10¢50%
Tin or Steel	..... 75¢75¢10%
Zinc	..... 65%

Malleable, Hammers Improved, No. 1,	
\$3.60; No. 2, \$4; No. 3, \$4.40	
Malleable, Hammers' Old Pattern,	
same list	..... 50¢10%
American Tube & Stamping Co.:	
Spring Bottom Cans	..... 70¢70¢10%
Railroad Oilers etc.	..... 60¢60¢10%

Openers—Can—

French	..... doz. 55c
Iron Handle	..... doz. 55¢57c
Sprague, Iron Handle	..... per doz. 55¢40c
Sardine Scissors	..... doz. \$1.75@3.00
National	..... per doz. \$1.25
Stowell's Sprague	..... per doz. 35¢45c
Tip Top	..... per doz. \$0.75
Trump Shear	..... per gro. \$9.00

Egg—

Nickel Plate	..... per doz., \$2.00
Silver Plate	..... per doz., \$4.00

Packing—

Asbestos Packing, Wick and Rope,	
1 1/2 1 1/2 1 1/2 lb.	

Rubber—

Iron Handle.....	doz. 25@37c
Sprague, Iron Hdle., per doz.	36@40c
Sardine Scissors...doz.	\$1.75@2.00

Stanley's Duplex..... 20¢ 25¢ 10¢ 10¢
Woods' Extension..... 33¢ 45¢

Poachers, Eggs—

Buffalo Steam Egg Poachers, # doz.,
No. 1, \$6.10; No. 2, \$5.00; No. 3,
\$4.00; No. 4, \$12.00..... 50¢

Points, Glaziers—

1/2 lb. papers..... 1 lb. 64¢
1/2 lb. papers..... 1 lb. 64¢

Pokes, Animal—

Fr. Madison Hawkeye..... # doz. \$3.25
Fr. Madison Western..... # doz. \$4.00

Police Goods—

Manufacturers' Lists..... 35¢ 35¢ 5¢
Towers'..... 35¢

Polish—Metal—

Prestoline Liquid, No. 1 (1 qt.), # doz.
\$3.00; No. 2 (1 qt.), \$0.75..... 40¢
Prestoline Paste..... 40¢ 10¢

George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, #
doz. \$0.50; # gr. \$4.50; 1/2 lb. boxes, #
doz. \$1.25; 1 lb. boxes, # doz. \$2.25.
U. S. Liquid, 1 oz. cans, # doz. \$1.25;
gr. \$12.00.

Barkeepers' Friend Metal Polish, # doz.
\$1.75; # gr. \$18.00.
Wynn's White Silk, 1/2 pt. cans, #
doz. \$2.00.

Stove—

Black Eagle Benzine Paste, 5 lb. cans.....
doz. 75¢
Black Eagle Liquid, 1/2 pt. cans, # doz. 75¢

Black Jack Paste, 1/2 lb. cans, # doz. \$0.90
Black Kid Paste, 1/2 lb. cans, # each, \$0.65
Ladd's Black Beauty, # gr. \$10.00..... 50¢

Joseph Dixon's, # gr. \$5.75..... 10¢
Dixon's Plumbago, # doz. \$6.50
Firestone, # gr. \$2.50..... 10¢

Gem, # gr. \$1.50..... 10¢
Japanese, # gr. \$3.50..... 10¢
Jet Black, # gr. \$3.50..... 10¢

Peerless Iron Enamel, 10 oz. cans.....
doz. \$1.50

Wynn's—

Black Silk, 5 lb. pail..... each 70¢
Black Silk, 1/2 lb. box..... # doz. \$1.00

Black Silk, 5 oz. box..... # doz. \$0.75
Black Silk, 1/2 pt. liq..... # doz. \$1.00

Poppers, Corn—

1 qt., Square..... gro. \$9.00
1 qt., Round..... gro. \$10.00

1 1/2 qt., Square..... gro. \$11.00
2 qt., Square..... gro. \$18.00

Post Hole and Tree Augers and Diggers—

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6
ft., 46¢; 6 ft., 46¢.

Steel Hitching Posts, each..... \$1.30

Potato Parers—

See Parers, Potato.

Pots—Glue—

Enamelled..... 50¢
Tinned..... 50¢

Powder—

In Canisters:

Duck, 1 lb. each..... 45¢
Fine Sporting, 1 lb. each..... 75¢

Rifle, 1/2 lb. each..... 15¢
Rifle, 1 lb. each..... 25¢

King's Semi-Smokeless:

Keq (35 lb bulk)..... \$6.50
Half Keq (12 1/2 lb bulk)..... \$3.50

Quarter Keq (6 1/4 lb bulk)..... \$1.90
Case 24 (1 lb cans bulk)..... \$4.50

Half case (1 lb cans bulk)..... \$4.50
King's Smokeless: Shot Gun Rifle

Keq (35 lb bulk)..... \$12.00 \$15.00
Half Keq (12 1/2 lb bulk)..... \$6.25 7.75

Quarter Keq (6 1/4 lb bulk)..... 3.50 4.00
Case 24 (1 lb cans bulk)..... 14.00 17.00

Half case (1 lb cans bulk)..... 7.25 8.75
Robin Hood Smokeless Shot Gun..... \$0.20

Presses—

Fruit and Jelly—

Enterprise Mfg. Co..... 20¢ 25¢
Sensitive..... 30¢ 35¢

2 qt., \$2.00; 4 qt., \$4.00; 10 qt., \$6.00 each.

Morrill's No. 1, per doz. \$20.00..... 50¢

Pruning Hooks and Shears—See Shears.**Pullers Nail—**

Cyclops..... 50¢
Dunlop Improved Nail Puller..... 50¢

Miller's Falls, No. 3, per doz. \$18.00..... 10¢

Pearson No. 1, Cyclops Spike Puller,
each \$30.00..... 50¢

Pearson, # doz. \$0.00..... 4¢ 10¢
Serrant, Case Lots:

No. 2 (large)..... \$5.50
No. 3 (small)..... \$2.00

Smith & Hemenway Co..... 60¢
Alux..... 60¢

Diamond B, No. 2, case lots, # doz. \$5.00
Diamond B, No. 2, case lots, # doz. \$5.00

Eureka..... 50¢
Grant, No. 1, # doz. \$18; No. 2, \$11.50;
No. 3, \$15..... 66¢ 5¢

Yankee..... 66¢ 5¢

Pulleys—Single Wheel—

Inch..... \$ 2 1/4 3
Ameniz, doz. \$2.55 2.5 1.15

Sash Pulleys—

Common Frame: Square or Round
End, per doz., 1 1/2 and 3 in., 16¢ 10¢

Auger Mortise, no Face Plate, per
doz. 1 1/2 and 2 in. 16¢ 10¢

Auger Mortise, with Face Plate, per
doz., 1 1/2 and 2 in. 16¢ 10¢

Acme..... 1 1/2 in., 16¢; 2 in., 10¢
Common Sense, 1 1/2 in. 16¢; 2 in., 10¢

For All-Steel, Nos. 3 and 7, 2 in. 10¢
Grand Rapids All-Steel Noiseless..... 50¢

Ideal..... 30¢ 35¢
Niagara..... 1 1/2 in., 16¢; 2 in., 19¢

No. 30, Troy..... 1 1/2 in., 14¢; 2 in., 16¢
Star..... 1 1/2 in., 10¢; 2 in., 19¢

Tackle Blocks—See Blocks.

Pumps—

Cistern..... 60¢ 6¢ 10¢
Pitcher Spout..... 80¢ 80¢ 15¢

Wood..... 50¢ 50¢ 1.5

Pump Leathers—

Plunger and Lower Valve—Per gro.:
Inch..... 2 2 1/4 2 1/4 2 1/4

Inch..... 3 3 1/4 3 1/4 3 1/4
Inch..... 3 3 1/4 3 1/4 3 1/4

Plunger Cup Leathers—Per 100:
Inch..... 2 1/4 3 3 1/4 4

Inch..... 2 1/4 3 3 1/4 4
Inch..... 2 1/4 3 3 1/4 4

Barnes Dbl. Acting (low list)..... 50¢ 10¢
Contractors' Rubber Diaphragm N. 2

H. & L. Block Co..... \$16.00
Daisy Spray Pump..... # d. \$1.30

Flint & Walling's Pitcher Spout..... 40¢
Flint & Walling's Pitcher Spout..... 40¢

National Specialty Mfg. Co., Measur-
ing..... 40¢
Mechanical Sprayer..... \$7.30

Myer's Pumps, low list..... 50¢
Myer's Power Pumps..... 80¢

Myer's Spray Pumps..... 50¢

Punches—

Saddlers' or Drive, good, # doz. 65¢ 70¢
Spring, single tube, good quality.....

Revolving (1 tubes)..... # doz. \$1.75 2.00
Bemis & Call Co.'s Cast Steel Drive.....

Bemis & Call Co.'s Check..... 55¢
Bemis & Call Co.'s Check..... 55¢

Benard Spring Belt Punches..... 30¢
Lodi Spring Belt Punches..... 30¢

Morrill's No. 1 (A. B. C.) # doz. \$15.00..... 30¢
No. 2, # doz. \$22.50..... 50¢

Hercules, each \$1.50..... 50¢
Niagara Hollow Punches..... 40¢

Niagara Solid Punches..... 55¢ 10¢
Paragon Spring Belt Punches..... 50¢

Steel Screw, B. & K. Mfg. Co..... 40¢
Tinner's Hollow, P. S. & W. Co. \$3.50 3.75

Tinner's Solid, P. S. & W. Co., # doz. \$1.44..... 60¢

Rail—Barn Door, &c.—

Cast Iron, Barn Door: Flange Ser. w
Holes for Rd. Groove Wheels:

1/4 3/4 1 1/4 1 3/4 2 1/4 2 3/4 3 1/4 3 3/4 4 1/4 4 3/4 5 1/4 5 3/4 6 1/4 6 3/4 7 1/4 7 3/4 8 1/4 8 3/4 9 1/4 9 3/4 10 1/4 10 3/4 11 1/4 11 3/4 12 1/4 12 3/4 13 1/4 13 3/4 14 1/4 14 3/4 15 1/4 15 3/4 16 1/4 16 3/4 17 1/4 17 3/4 18 1/4 18 3/4 19 1/4 19 3/4 20 1/4 20 3/4 21 1/4 21 3/4 22 1/4 22 3/4 23 1/4 23 3/4 24 1/4 24 3/4 25 1/4 25 3/4 26 1/4 26 3/4 27 1/4 27 3/4 28 1/4 28 3/4 29 1/4 29 3/4 30 1/4 30 3/4 31 1/4 31 3/4 32 1/4 32 3/4 33 1/4 33 3/4 34 1/4 34 3/4 35 1/4 35 3/4 36 1/4 36 3/4 37 1/4 37 3/4 38 1/4 38 3/4 39 1/4 39 3/4 40 1/4 40 3/4 41 1/4 41 3/4 42 1/4 42 3/4 43 1/4 43 3/4 44 1/4 44 3/4 45 1/4 45 3/4 46 1/4 46 3/4 47 1/4 47 3/4 48 1/4 48 3/4 49 1/4 49 3/4 50 1/4 50 3/4 51 1/4 51 3/4 52 1/4 52 3/4 53 1/4 53 3/4 54 1/4 54 3/4 55 1/4 55 3/4 56 1/4 56 3/4 57 1/4 57 3/4 58 1/4 58 3/4 59 1/4 59 3/4 60 1/4 60 3/4 61 1/4 61 3/4 62 1/4 62 3/4 63 1/4 63 3/4 64 1/4 64 3/4 65 1/4 65 3/4 66 1/4 66 3/4 67 1/4 67 3/4 68 1/4 68 3/4 69 1/4 69 3/4 70 1/4 70 3/4 71 1/4 71 3/4 72 1/4 72 3/4 73 1/4 73 3/4 74 1/4 74 3/4 75 1/4 75 3/4 76 1/4 76 3/4 77 1/4 77 3/4 78 1/4 78 3/4 79 1/4 79 3/4 80 1/4 80 3/4 81 1/4 81 3/4 82 1/4 82 3/4 83 1/4 83 3/4 84 1/4 84 3/4 85 1/4 85 3/4 86 1/4 86 3/4 87 1/4 87 3/4 88 1/4 88 3/4 89 1/4 89 3/4 90 1/4 90 3/4 91 1/4 91 3/4 92 1/4 92 3/4 93 1/4 93 3/4 94 1/4 94 3/4 95 1/4 95 3/4 96 1/4 96 3/4 97 1/4 97 3/4 98 1/4 98 3/4 99 1/4 99 3/4 100 1/4 100 3/4 101 1/4 101 3/4 102 1/4 102 3/4 103 1/4 103 3/4 104 1/4 104 3/4 105 1/4 105 3/4 106 1/4 106 3/4 107 1/4 107 3/4 108 1/4 108 3/4 109 1/4 109 3/4 110 1/4 110 3/4 111 1/4 111 3/4 112 1/4 112 3/4 113 1/4 113 3/4 114 1/4 114 3/4 115 1/4 115 3/4 116 1/4 116 3/4 117 1/4 117 3/4 118 1/4 118 3/4 119 1/4 119 3/4 120 1/4 120 3/4 121 1/4 121 3/4 122 1/4 122 3/4 123 1/4 123 3/4 124 1/4 124 3/4 125 1/4 125 3/4 126 1/4 126 3/4 127 1/4 127 3/4 128 1/4 128 3/4 129 1/4 129 3/4 130 1/4 130 3/4 131 1/4 131 3/4 132 1/4 132 3/4 133 1/4 133 3/4 134 1/4 134 3/4 135 1/4 135 3/4 136 1/4 136 3/4 137 1/4 137 3/4 138 1/4 138 3/4 139 1/4 139 3/4 140 1/4 140 3/4 141 1/4 141 3/4 142 1/4 142 3/4 143 1/4 143 3/4 144 1/4 144 3/4 145 1/4 145 3/4 146 1/4 146 3/4 147 1/4 147 3/4 148 1/4 148 3/4 149 1/4 149 3/4 150 1/4 150 3/4 151 1/4 151 3/4 152 1/4 152 3/4 153 1/4 153 3/4 154 1/4 154 3/4 155 1/4 155 3/4 156 1/4 156 3/4 157 1/4 157 3/4 158 1/4 158 3/4 159 1/4 159 3/4 160 1/4 160 3/4 161 1/4 161 3/4 162 1/4 162 3/4 163 1/4 163 3/4 164 1/4 164 3/4 165 1/4 165 3/4 166 1/4 166 3/4 167 1/4 167 3/4 168 1/4 168 3/4 169 1/4 169 3/4 170 1/4 170 3/4 171 1/4 171 3/4 172 1/4 172 3/4 173 1/4 173 3/4 174 1/4 174 3/4 175 1/4 175 3/4 176 1/4 176 3/4 177 1/4 177 3/4 178 1/4 178 3/4 179 1/4 179 3/4 180 1/4 180 3/4 181 1/4 181 3/4 182 1/4 182 3/4 183 1/4 183 3/4 184 1/4 184 3/4 185 1/4 185 3/4 186 1/4 186 3/4 187 1/4 187 3/4 188 1/4 188 3/4 189 1/4 189 3/4 190 1/4 190 3/4 191 1/4 191 3/4 192 1/4 192 3/4 193 1/4 193 3/4 194 1/4 194 3/4 195 1/4 195 3/4 196 1/4 196 3/4 197 1/4 197 3/4 198 1/4 198 3/4 199 1/4 199 3/4 200 1/4 200 3/4 201 1/4 201 3/4 202 1/4 202 3/4 203 1/4 203 3/4 204 1/4 204 3/4 205 1/4 205 3/4 206 1/4 206 3/4 207 1/4 207 3/4 208 1/4 208 3/4 209 1/4 209 3/4 210 1/4 210 3/4 211 1/4 211 3/4 212 1/4 212 3/4 213 1/4 213 3/4 214 1/4 214 3/4 215 1/4 215 3/4 216 1/4 216 3/4 217 1/4 217 3/4 218 1/4 218 3/4 219 1/4 219 3/4 220 1/4 220 3/4 221 1/4 221 3/4 222 1/4 222 3/4 223 1/4 223 3/4 224 1/4 224 3/4 225 1/4 225 3/4 226 1/4 226 3/4 227 1/4 227 3/4 228 1/4 228 3/4 229 1/4 229 3/4 230 1/4 230 3/4 231 1/4 231 3/4 232 1/4 232 3/4 233 1/4 233 3/4 234 1/4 234 3/4 235 1/4 235 3/4 236 1/4 236 3/4 237 1/4 237 3/4 238 1/4 238 3/4 239 1/4 239 3/4 240 1/4 240 3/4 241 1/4 241 3/4 242 1/4 242 3/4 243 1/4 243 3/4 244 1/4 244 3/4 245 1/4 245 3/4 246 1/4 246 3/4 247 1/4 247 3/4 248 1/4 248 3/4 249 1/4 249 3/4 250 1/4 250 3/4 251 1/4 251 3/4 252 1/4 252 3/4 253 1/4 253 3/4 254 1/4 254 3/4 255 1/4 255 3/4 256 1/4 256 3/4 257 1/4 257 3/4 258 1/4 258 3/4 259 1/4 259 3/4 260 1/4 260 3/4 261 1/4 261 3/4 262 1/4 262 3/4 263 1/4 263 3/4 264 1/4 264 3/4 265 1/4 265 3/4 266 1/4 266 3/4 267 1/4 267 3/4 268 1/4 268 3/4 269 1/4 269 3/4 270 1/4 270 3/4 271 1/4 271 3/4 272 1/4 272 3/4 273 1/4 273 3/4 274 1/4 274 3/4 275 1/4 275 3/4 276 1/4 276 3/4 277 1/4 277 3/4 278 1/4 278 3/4 279 1/4 279 3/4 280 1/4 280 3/4 281 1/4 281 3/4 282 1/4 282 3/4 283 1/4 283 3/4 284 1/4 284 3/4 285 1/4 285 3/4 286 1/4 286 3/4 287 1/4 287 3/4 288 1/4 288 3/4 289 1/4 289 3/4 290 1/4 290 3/4 291 1/4 291 3/4 292 1/4 292 3/4 293 1/4 293 3/4 294 1/4 294 3/4 295 1/4 295 3/4 296 1/4 296 3/4 297 1/4 297 3/4 298 1/4 298 3/4 299 1/4 299 3/4 300 1/4 300 3/4 301 1/4 301 3/4 302 1/4 302 3/4 303 1/4 303 3/4 304 1/4 304 3/4 305 1/4 305 3/4 306 1/4 306 3/4 307 1/4 307 3/4 308 1/4 308 3/4 309 1/4 309 3/4 310 1/4 310 3/4 311 1/4 311 3/4 312 1/4 312 3/4 313 1/4 313 3/4 314 1/4 314 3/4 315 1/4 315 3/4 316 1/4 316 3/4 317 1/4 317 3/4 318 1/4 318 3/4 319 1/4 319 3/4 320 1/4 320 3/4 321 1/4 321 3/4 322 1/4 322 3/4 323 1/4 323 3/4 324 1/4 324 3/4 325 1/4 325 3/4 326 1/4 326 3/4 327 1/4 327 3/4 328 1/4 328 3/4 329 1/4 329 3/4 330 1/4 330 3/4 331 1/4 331 3/4 332 1/4 332 3/4 333 1/4 333 3/4 334 1/4 334 3/4 335 1/4 335 3/4 336 1/4 336 3/4 337 1/4 337 3/4 338 1/4 338 3/4 339 1/4 339 3/4 340 1/4 340 3/4 341 1/4 341 3/4 342 1/4 342 3/4 343 1/4 343 3/4 344 1/4 344 3/4 345 1/4 345 3/4 346 1/4 346 3/4 347 1/4 347 3/4 348 1/4 348 3/4 349 1/4 349 3/4 350 1/4 350 3/4 351 1/4 351 3/4 352 1/4 352 3/4 353 1/4 353 3/4 354 1/4 354 3/4 355 1/4 355 3/4 356 1/4 356 3/4 357 1/4 357 3/4 358 1/4 358 3/4 359 1/4 359 3/4 360 1/4 360 3/4 361 1/4 361 3/4 362 1/4 362 3/4 363 1/4 363 3/4 364 1/4 364 3/4 365 1/4 365 3/4 366 1/4 366 3/4 367 1/4 367 3/4 368 1/4 368 3/4 369 1/4 369 3/4 370 1/4 370 3/4 371 1/4 371 3/4 372 1/4 372 3/4 373 1/4 373 3/4 374 1/4 374 3/4 375 1/4 375 3/4 376 1/4 376 3/4 377 1/4 377 3/4 378 1/4 378 3/4 379 1/4 379 3/4 380 1/4 380 3/4 381 1/4 381 3/4 382 1/4 382 3/4 383 1/4 383 3/4 384 1/4 384 3/4 385 1/4 385 3/4 386 1/4 386 3/4 387 1/4 387 3/4 388 1/4 388 3/4 389 1/4 389 3/4 390 1/4 390 3/4 391 1/4 391 3/4 392 1/4 392 3/4 393 1/4 393 3/4 394 1/4 394 3/4 3

Screws—Bench and Hand—

Bench, Iron, doz. 1 in. \$2.50 @ \$2.75
 1 1/2, \$3.00 @ \$3.25
 2, \$3.50 @ \$3.75
 Bench, Wood, doz. 30 @ \$2.00
 Hand, Wood, doz. 30 @ \$2.00
 R. Hillis Mfg. Co., Hand, doz. 30 @ \$2.00
 Chapin-Stephens Co., Hand, doz. 30 @ \$2.00
Coach, Lag and Hand Rail—
 Lag, Common Point, list Oct. 1.
 99.
 Coach and Lag, Gimlet Point, list
 Oct. 1, '99.
 Hand Rail, list Jan. 1, '81, 70¢ @ 10¢ 75¢

Jack Screws—

Standard List, 75¢ @ 10¢ 80¢ 55¢
 Millers Falls, 50¢ @ 10¢ 55¢
 Millers Falls, Roller, 50¢ @ 10¢ 55¢
 P. S. & W., 50¢ @ 10¢ 55¢
 Sargent, 70¢

Machine—

List Jan. 1, '98.
 Flat or Round Head, Iron, 50¢ @ 50¢ 10¢
 Flat or Round Head, Brass, 50¢ @ 50¢ 10¢

Set and Cap—

Set (Iron or Steel) 70¢ @ 10¢ 85¢ Extra
 Sq. Hd. Cap, 65¢ @ 10¢ 55¢ 10¢ 10
 Hex. Hd. Cap, 65¢ @ 10¢ 55¢ often
 Rd. or Fullister Hd. Cap 60¢ given.

Wood—

List July 23, 1903.
 Manufacturers' printed discounts:
 Flat Head, Iron, 87¢ @ 10¢ 90¢
 Round Head, Iron, 85¢ @ 10¢ 90¢
 Flat Head, Brass, 85¢ @ 10¢ 90¢
 Round Head, Brass, 80¢ @ 10¢ 90¢
 Flat Head, Bronze, 77¢ @ 10¢ 90¢
 Round Head, Bronze, 75¢ @ 10¢ 90¢
 Drive Screws, 87¢ @ 10¢ 90¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Per doz.
 Clipper Pattern, Grass, \$4.25 @ \$5.00
 Full Polished Clipper, \$4.75 @ \$5.50
 Grain, \$7.00 @ \$7.50
 Clipper, Grain, \$7.75 @ \$8.25
 Weed and Bush, \$4.50 @ \$5.00

Seeders—Raisins—

Enterprise, 25¢ @ 30¢
Sets—Awl and Tool—
 Brad Awl and Tool Sets:
 Wood Hdl., 10 A. wds doz. \$2.00 @ \$2.25
 Wood Hdl., 11 A. wds, 6 Tools, doz. \$3.50 @ \$3.60

Alken's Sets, Awl and Tools:
 No. 30, doz. \$1.00 @ 50¢ 10¢ 10¢
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Tools—Coopers'—

L. & J. White. Hay—30@20.5%

Myers' Hay Tools.....50%

Stowell's Hay Carriels.....5%

Stowell's Hay Forks.....50%

Stowell's Fork Pulleys.....5%

Saw—

Atkins' Cross Cut Saw Tools.....40%

Simonds' Improved.....33.5%

Simonds' Crescent.....25%

Ship—

L. & J. White.....25%

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme.....

doz. \$1.15 to 1.25; gro. \$11.50 to 12.00

Harper, Champion or Paragon

doz. \$1.55 to 1.70; gro. \$13.00 to 13.50

Game—

Oneida Pattern.....75¢ to 10¢ to 10¢ to 10¢

Newhouse.....45¢ to 45¢ to 5%

Hawley & Norton.....65¢ to 65¢ to 5%

Victor (Oneida Pattern).....75¢ to 75¢ to 5%

O.C. Jump (Blake Pattern) 60¢ to 60¢ to 10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes.....

8 1/2 to 9¢

Mouse, Round or Square Wire.....

doz. 85¢ to 90¢

Marty French Rat and Mouse Traps

(Genuine).....

No. 1, Rat, Each \$1.12 1/2; doz. \$12.00

No. 2, Rat, doz. \$6.00; case of 50

No. 3 1/2, Rat, doz. \$4.75; case of 72

No. 4, Mouse, doz. \$3.50; case of 7

No. 5, Mouse, doz. \$2.75; case of 150

Schuyler's Rat Killer, No. 1, per doz. \$30.00

No. 2, per doz. \$30.00; Mouse, No. 3,

\$18.00

J. M. Mast Mfg. Co., Per doz. 50%

Blizzard—

No. 12, \$3.00 No. 1, \$9.50

Old Nick.....2.25 No. 2, 8.40

Joker.....No. 5, 2.10 No. 3, 8.40

Imp'd Snap Shot, Mouse, per gro., 4

hole, \$2.40

Imp'd Snap Shot, Mouse, per gro., 4

hole, \$1.20

Trimmers Spoke—

Bonney's No. 1 and 2.....33 1/2%

Wood's E. I.....50%

Trowels—

Diston Brick and Pointing.....30%

Diston Plastering.....25%

Diston "Standard Brand" and 1 Gar-

den Trowels.....35%

Kohler's Steel Garden Trowels, 5 in.

per doz. \$5.00

Kohler's Steel Garden Trowels, 6 in.

per doz. \$6.00

Never-Break Steel Garden Trowels.....

per doz. \$1.00

Rose Brick and Plastering.....

Woodrough & McFarlin, Plastering.....25%

Trucks, Warehouse, &c.—

B. & L. Block Co.,

New York Pattern.....50¢ to 10%

Western Pattern.....60¢ to 10%

Handy Trucks.....per doz. \$16.00

Grocery.....per doz. \$15.00

Daisy Stove Trucks, Improved Pattern

per doz. \$18.50

Model Stove Trucks.....per doz. \$18.50

Tubs, Wash—

No. 1 2 3

Galvanized, per doz. \$5.00 5 5 1 6.25

Galvanized Wash Tubs (S. S. & Co.),

No. 1 2 3 10 20 30

Per doz., net \$5.70 6.50 7.20 6.50 7.20 8.10

Twine—Miscellaneous—

Flax Twine—BC, B.

No. 9, 1/4 and 1/2 lb. Balls.....22¢ to 24¢

No. 12, 1/4 and 1/2 lb. Balls.....18¢ to 20¢

No. 18, 1/4 and 1/2 lb. Balls.....16¢ to 18¢

No. 24, 1/4 and 1/2 lb. Balls.....14¢ to 16¢

No. 36, 1/4 and 1/2 lb. Balls.....12¢ to 14¢

Chalk Line, Cotton, 1/2 lb

Balls.....30¢

Cotton Mops, 6, 9, 12 and 15 in. to

doz.....10¢ to 12¢

Cotton Wrapping 5 Balls to lb

according to quality.....10¢ to 25¢

American 2-Ply Hemp, 1/4 and 1/2 lb.

Balls.....12¢ to 14¢

American 3-Ply Hemp, 1-lb. Balls.

12¢ to 14¢

India 2-Ply Hemp, 1/4 and 1/2 lb. Balls

(Spring Twine).....9¢

India 2-Ply Hemp, 1-lb. Balls.....

9¢

India 3-Ply Hemp, 1/4-lb. Balls.....

8¢

2, 3, 4 and 5-Ply Jute, 1/4-lb. Balls.....

9¢ to 10¢

Mason Line, Linen, 1/4-lb. Balls.....

16¢

No. 26 Mattress, 1/4 and 1/2-lb. Balls.....

37¢

Wool, 3 to 6 ply.....

54¢ to 60¢

Vises—

Solid Box.....50¢ to 100¢ to 60%

Parallel—

Athol Machine Co.

Simpson's Adjustable.....40%

Standard.....40%

Amateur.....25%

Bonney's.....33 1/2%

Columbian Hdw. Co.....40%

Emmert Universal

Pattern Makers' No. 1.....\$15.00

Pattern Makers' No. 2.....\$12.50

Machinist and Tool Makers' No. 4, \$12.50

Fisher & Norris Double Screw.....15¢ to 10%

Holland's—

Machinists'.....40¢ to 40¢ to 5%

Keystone.....85¢ to 70%

Lewis Tool Co.....20¢ to 30%

Merrill's.....30%

Miller's Falls.....60¢ to 10%

Massey Vise Co.

Climber.....40%

Perfect.....75%

Lightning Grip.....20%

Parker's:

Victor.....20¢ to 25%

Regulars.....20¢ to 25%

Vulcan.....40¢ to 45%

Combination Pipe.....55¢ to 60%

Sargent's.....20¢ to 25%

Smith & Hemenway Co.

Machinists'.....40%

Jewellers'.....33 1/2%

Snediker's X. L.....33 1/2%

Stephens'.....33 1/2%

Saw Filers—

Bonney's No. 1, \$13; No. 3, \$6.....40%

Diston's D 3 Clamp and Guide, per doz

\$30.....25%

Perfection Saw Clamps, per doz.....85¢ to

Reading.....60%

Wenworth's Rubber Jaw, Nos. 1, 2

and 3.....15¢ to 50%

Wood Workers'—

Massey Vise Co.

Lightning Grip.....15%

Perfect.....15%

Wyman & Gorlon's Quick Action, 6

in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—

Bigall & Keeler Combination Pipe

Holland Combination Pipe.....60¢ to 65¢

Massey's Quick Action Pipe.....40%

Parker's Combination Pipe:

87 Series.....80%

187 Series.....60¢ to 5%

No. 870.....40%

Wads—Price Per M.

B. E., 11 up.....60¢

B. E., 9 and 10.....70¢

B. E., 8.....80¢

B. E., 7.....80¢

P. E., 11 up.....\$1.00

P. E., 9 and 10.....1.25

P. E., 8.....1.50

P. E., 7.....1.50

Ely's B. E., 11 and larger.....\$1.70 to 1.75

Ely's P. E., 12 to 20.....\$3.00 to 3.45

Ware Hollow—**Cast Iron, Hollow—**

Stove Hollow Ware:

Enameled.....55¢ to 100¢ to 60%

Ground.....60¢ to 100¢ to 60%

Plain or Ungrained.....65¢ to 100¢ to 70%

Country Houseware per 100 lbs., \$2.50

White Enameled Ware:

Maiden Kettles.....70%

Covered Ware.....40%

Tinned and Turned.....50%

Enameled.....50%

See also Fats Glue.

Enameled—

Agate Nickel Steel Ware.....50¢ to 20

Agate Nickel Steel Ware, Specials.....60¢ to 15%

Iron Clad Ware.....70¢ to 10%

Lava, Enameled.....40¢ to 10%

Never Break Enameled—

Galvanized Tea Kettles:

Inch.....6 7 8 9

Each.....15¢ 50¢ 65¢ 65¢

Steel Hollow Ware.

Avery Spiders & Griddles.....65¢ to 55%

Avery Kettles.....50%

Porcelain.....50¢ to 50¢ to 10%

Never Break Spiders and Griddles.....65¢ to 5%

Never Break Kettles.....60%

Solid Steel Spiders & Griddles.....65¢ to 5%

Solid Steel Kettles.....60%

Washboards—

Solid Zinc.....per doz

Crescent, family size, bent frame.....\$3.00

Red Star, family size, stationary

protector.....\$3.00

Double Zinc Surface

Saginaw Globe, family size, station-

ary protector.....\$2.65

Cable Cross, family size, stationary

protector.....\$2.90

Single Zinc Surface:

Salad, family size, open back perfo-

rated.....\$3.40

Saginaw Jobe, protector, family

size, ventilated back.....\$2.25

Bras Surface:

Brass King, Single Surface, open

back.....\$3.00

Nickel Plate Surface:

No. 1001 Nickel Plate, Single Surface

\$3.00

Washers—**Leather, Axle—**

Solid.....80¢ to 100¢ to 100%

Patent.....90¢ to 90¢ to 100%

Coil:

1/2 1 1 1/4 1 1/2 inch.

1 1/2 1 1/2 1 1/2 1 1/2 per box

Iron or Steel

Size bolt.....5-16 3/8 1/2 5/8 3/4

Washers.....\$5.10 4.20 2.90 2.70 2.50

In lots less than one keg add 1/4¢ per

lb., 5-lb. boxes add 1/4¢ to list.

Cast Washer—

Over 1/2 inch, barrel lots, per lb.....

1/4 to 2¢

Waterers, Hog—

Improved Dewey, per doz.....\$13.00

Wedges—

Oil Finish.....lb. 2.35 to 2.40¢

Weights—**Hitching—**

Covert's Saddlery Works.....60¢ to 10%

Sash—

Per ton, f.o.b. factory:

Eastern District.....\$25.00

Western, Central and Southern

Districts market unsettled,

prices ranging from \$21.00 to 25.00

Wheels, Well—

8-in. \$1.60 to 1.80; 10-in., \$2.00 to 2.25;

12-in., \$2.50 to 2.65; 14-in., \$4.00 to 4.25

Wire and Wire Goods—

Bright and Annealed:

6 to 9.....75¢ to 75¢ to 10%

10 to 18.....75¢ to 75¢ to 10%

19 to 26.....75¢ to 100¢ to 30%

27 to 36.....75¢ to 100¢ to 30%

Galvanized:

6 to 9.....70¢ to 70¢ to 10%

10 to 18.....70¢ to 70¢ to 10%

19 to 26.....75¢ to 75¢ to 10%

27 to 36.....70¢ to 70¢ to 10%

Coppered:

6 to 9.....70¢ to 70¢ to 10%

10 to 18.....70¢ to 70¢ to 10%

19 to 26.....75¢ to 75¢ to 10%

27 to 36.....70¢ to 70¢ to 10%

Tinned:

6 to 14.....75¢ to 100¢ to 75%

15 to 18.....70¢ to 100¢ to 75%

19 to 26.....65¢ to 100¢ to 70%

27 to 36.....60¢ to 60¢ to 70%

Annealed, Steel and Tin, etc., on

Spoons.....70¢ to 70¢ to 10%

Brass & Copper on Spoons.....60¢ to 10%

Brass, list Feb. 26, '96.....30%

Copper, list Feb. 26, '96.....15%

Cast Steel Wire.....50%

Wire Clothes Line, see Lines.....70%

Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, 1903.....50¢ to 90¢ to 10%

Wire Cloth and Netting—

Galvanized Wire Netting

